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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

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SMOKELESS POWDERS.

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FOR about six years now both the militant and scientific worlds have been more or less agitated by the apparent advent of a new era in explosives for cannon and small-arms. It has become evident that the old, familiar type of *gunpowder*, which has done faithful duty for these many centuries and played such an important rôle in the history-making of its time, no longer answers all the requirements of modern warfare. It has fallen into disrepute in certain ways and is apparently doomed to retirement from more active service, though it may for some time continue to play at least a *secondary* part in military and naval operations of the future.

For over thirty years untiring efforts have been made to keep pace with the rapidly changing conditions. By slight variations in its ingredients, the slower burning brown or *cocoa* powders have been adapted for use with high-power guns. By considerable improvements in manufacture, by varying the size, shape, hardness and density of grains, each arm, large or small, has had a powder specially adapted to its own construction and uses. But one objection could not be overcome. The fact has gradually developed that the large volume of dense smoke accompanying its explosion is no longer to be tolerated. It has only recently become a settled matter, apparently, that one of the

prime requisites of a ballistic explosive should consist in absence of smoke when burned. Other properties heretofore considered as more essential have now become to a certain extent secondary considerations.

The modern battle-ship, with its few high-power guns using enormous charges, and its extensive secondary batteries of rapid-fire and machine-guns, would, when engaged, soon surround itself with a dense smoke-cloud, and then be more or less open to attack by the fleet of swift-moving and almost invisible torpedo boats. Of what advantage then would be the rapid-firing guns, with a capacity for ten shots per minute, if after the first few rounds aim was impeded and sight lost of the flying target?

The same difficulty was also developed with the small-arm magazine rifles. It became evident that their effectiveness would be greatly impaired by the inevitable smoke-cloud of the old powder. Then again, on the introduction of the small calibre, it was found that the excessive fouling of the ordinary black powder had become a troublesome matter.

It appears that practical chemists and "all-around" inventors have been for many years engaged in quiet search for a smokeless explosive adapted to fire-arms. It was not, however, until the announcement in 1885, by the French authorities, of the marvellous quality of their new and secret *Lebel* explosive, that the problem was attacked elsewhere with a determination which disregarded utterly either labor or expense. France exhibited great elation over the possession of what was then considered a high trump-card for the great game of war which had for so long been apparently on the point of opening.

Her enemies were for a short time correspondingly depressed. Evidently then an important question of the morale was involved.

It proved true, later, that the French claims were greatly exaggerated—*à la mélinite*—and its new acquisition soon developed defects which could not be overcome. A most excellent authority* stated in 1889 that "it is now well known that more than one explosive has succeeded the original powder" and "that the material at present adapted for use in the Lebel rifle, bears, at any rate, great similarity to preparations which are still experimental powders in other countries." So there is little doubt that in other cases also, owing to the peculiar relations

* Sir Frederick Abel, English War Department Chemist.

existing between the various European powers, brands of smokeless powders have been in actual use, afloat and ashore, which have not been thoroughly tested under all the necessary conditions.

The situation abroad was well expressed by the statement* that "notwithstanding the uncertainty which still exists on this subject, no State can, however, resist the tendency towards its adoption."

It was evident that the ball had been set in motion with such impetus that there was no arresting it, and if for a time every month saw the arrival of one or more new members of the great smokeless powder family, there was developed in it on the other hand an alarming mortality.

But it would seem that when the scientific men of this *fin de siècle* period are given *carte blanche* as to money and means, success must surely crown their efforts, especially since riches and honors are the rewards to be expected. To-day, although there are still skeptics among those most thoroughly posted on this matter, still it must be confessed that the weight of evidence establishes the existence among the numerous smokeless explosives of a limited number the success of which seems to have been attained. It has apparently established itself as a permanent innovation.† In this country, however, we can well afford to be conservative in this matter, and accept only so much as is beyond question or can be verified by exhaustive tests.

In any event, these new powders are entitled to careful consideration in themselves, and as regards the attendant changes to be brought about by them in both land and naval tactics. We will be compelled to rest satisfied with imperfect information in many cases, as to details; still the general principles involved are pretty well known, and a presentation of these will suffice for our purposes. It is hardly necessary to add that this has not yet become a subject for encyclopædic information, and at this point the sources for reference are limited.

Now, to insure complete and unquestioned success in an explosive for propelling projectiles, any composition must comply more or less fully with certain conditions. It may be well

* Official report to Swiss Federal Assembly.

† As early as 1889 Mr. Nordenfelt declared: "It is not a question any longer of whether we shall have smokeless powders or not; it is a question of which smokeless powder we must have."

then to enumerate at this point the essential requisites of a *smokeless* powder. They are as follows:

I. Approximate smokelessness of the products of explosion.

II. It must give high and uniform velocities with safe and regular pressures.

III. It must possess chemical and physical stability under varying conditions of moisture, temperature, and age.

IV. It must not cause excessive fouling, either from powder residue, or *metallic* from the projectile or its envelope.

V. It must not be sensitive to explosion from friction or shock.

VI. The manufacture should not be attended with great difficulty or excessive danger; the ingredients should not be very expensive.

VII. The products of explosion must be comparatively free from noxious or irrespirable gases and from those which would rapidly corrode the gun.

VIII. There must be entire freedom from chemical action in connection with the metallic cartridge case used with small-arms, rapid-firing, machine, and even field guns.

It is also an advantage if a reduced weight suffices to give the required velocity, and also if the specific gravity be such that the charge does not occupy too much space.

Regarding the reported *noiselessness* of small-arm volleys fired with the new powders, that is an absurdity which should not have been so readily accepted in intelligent quarters. The use of small blank charges on the drill ground has, doubtless, given rise to false impressions on the part of newspaper correspondents which have been by them transmitted. In this connection it must not be forgotten that with many of the smokeless powders their full power is only developed by the resistance to motion offered by the projectile. Unless closely confined and under considerable pressure some will not explode at all, and in a blank cartridge it is easy to conceive that the burning might be more like the fizzle of a damp fuse. When full charges are fired with ball cartridges, there results a sharp crack, the pitch being higher but the volume of sound less than in the explosion of the old ammunition, so that the sound will be heard a less distance. That is the most that can truthfully be said.

I. APPROXIMATE SMOKELESSNESS.

With the new powders this is of course, the consideration of

prime interest. In this respect perfection has not so far been attained, nor is that considered possible. The reasons will be developed later. A sufficient measure of success has been met with, however, to satisfy this condition. The word *smokeless* is therefore used with a modified meaning, and simply signifies that the smoke emitted on firing is so slight as not to obscure either the firer or the object fired at, and is so quickly dissipated as to admit of continuous firing with accuracy. In one case it is referred to as a "very thin bluish smoke which quickly dissipates"; in another the smoke is described as a "slight filmy vapor which disappears very quickly"; and in still a third as simply a "dusty puff."

Now smoke, so called, is for our present purposes the emitted visible portion of the products of decomposition. In order that approximate smokelessness may accompany the explosion of a charge, it is essential that the chemical products of decomposition be mainly gaseous at the temperature of the explosion.

With the common black powder, the considerable volume of thick smoke is due to the mechanical diffusion in a finely divided state, throughout the gases and vapors, of a considerable portion of the products which remain solid or liquid, even at the extremely high temperature of the explosion. The smaller portion of the non-gaseous products is deposited as fouling in the bore.

It has been determined by reliable experiments that with ordinary gunpowder in a closed vessel, about 57 per cent. of the products of decomposition ultimately assume the solid form.

The principal solid products are as indicated by the following reactions:—potassium carbonate and potassium sulphate.

$4\,KNO_3 + 4\,C + S = K_2\,CO_3 + K_2\,SO_4 + 2\,CO_2 + CO + 4\,N.$ (Wardell.)

$16\,KNO_3 + 6\,S + 13\,C = 5\,K_2\,SO_4 + 2K_2\,CO_3 + K_2\,S + 16\,N + 11\,CO_2$ (Berthelot.)

These are only theoretical reactions intended to approximate more or less closely to the actual. But those which actually take place vary from one explosion to another with all the attendant circumstances, and are far more complicated.

We know that ordinarily there are produced other minor solid products of combustion, principally compounds of potassium and sulphur.

By no variations in the proportions, ingredients, or processes of manufacture of ordinary gunpowder, can any considerable re-

duction be made in the amount of these solid products and hence in the amount of smoke.

Smoke may result, moreover, in the explosion of various compounds, from the condensation of vapor resulting from the cooling effects of the air as the gases expand on leaving the gun. It consists in this case of minute liquid particles or vesicles carried along by the transparent gases. This condensed and visible vapor is often *aqueous* as will be seen later, but may be *mercurial* from the decomposition of the fulminate, or of other composition depending upon the nature of the explosive. This would in most cases doubtless present but a thin haze and be quickly dissipated. The lubricant also adds its small contribution to the smoke products, and the ordinary impurities of substances which in the reactions are considered chemically pure, will account for the small remainder.

One arrives now, naturally, at what will be considered as the first class of the so-called smokeless powders. These are designated as:

CLASS I. *Nitrate Mixtures, Other Than Ordinary Gunpowder.*

Regarding the mechanical mixtures akin to ordinary gunpowder, it will be apparent that when the necessary oxygen is supplied by any *metallic* salt—usually a *nitrate*—then there must invariably result on combustion the solid salts—carbonates, sulphates, etc.,—which form in such great part the objectionable smoke.

There is one *compound*, however, which seems nearly related to potassium, sodium, barium, etc. This is *ammonium*, represented by the symbol NH_4. It is so similar in its combinations and characteristics to the metals mentioned, that it is associated with them in chemical literature. It plays the same part in its salts as do potassium and sodium in their respective compounds. To its nitrate then, ($NH_4 NO_3$), attention was early directed in the search for a smokeless explosive, as the products of its decomposition by heat are, with the exception of the water vapor, *entirely gaseous.*

To obtain desired ballistic results, however, the introduction of a certain proportion of potassium nitrate is found necessary. The amount of smoke is considerably reduced, but an extremely serious objection exists to any mixture containing ammonium nitrate, arising from the tendency of this salt to absorb moisture,

especially when the atmospheric moisture approaches saturation. In consequence, these powders are likely to deteriorate rapidly. This fact tends to limit the use of these ammonium nitrate explosives to sealed metallic cases, such as are used with small-arms, rapid-firing and machine guns, and in some instances with field guns.

Even under such circumstances these powders are liable to change, and to develop varying pressures when exposed to high temperatures for any length of time. These compositions naturally contain more water than even the brown powder, and though in air-tight cases there naturally results, when subjected to heat for considerable periods, the expulsion of moisture from portions of the powder masses and consequent want of uniformity in burning. This would be especially likely to occur in the magazines of war vessels. The ammunition would then be a continual source of anxiety, for any change in the composition, even if it did not result in the development of dangerous pressures, would still render unreliable the sights of arms graduated for the powder in its normal condition.

Experiments have been conducted looking to the production of a coating for these powders which will render them impervious to atmospheric influences. As to what success this attempt has met with there seems to be no reliable information.

Under any circumstances these powders cannot be considered as well adapted for use in the naval service.

Examples.

1. Amide Powder (1885) F. Gaen.

Composition:

46 per cent.	KNO_3 (Potassium Nitrate.)
36 per cent.	$NH_4 NO_3$ (Ammonium Nitrate.)
18 per cent.	Charcoal.

The theoretical burning, in accordance with the ideas of the inventor, is represented by the reaction:

$$KNO_3 + NH_4 NO_3 + 3C = KH_2 N + H_2 O + CO + 2CO_2 + 2N.$$

He advances the theory that this $KH_2 N$, which he calls *potass-imide*, is volatile at high temperatures, and that it increases the useful effect of the explosive.

Mr. Deering * considers that the main course of the chemical change would be represented by—

$$2KNO_3 + 2NH_4NO_3 + 6C = K_2CO_3 + 5CO + 4H_2O + 6N.$$

with some inter-reaction between the CO and water vapor at the high temperature, with formation of CO_2 and H.

He further states that he is not able to find any statement in chemical literature of the existence of a *potassimide*, volatile as such.

The volume of total gases produced by this powder would be very large, and its rate of burning probably slow, due to the absence of sulphur.

It would give a thin smoke and little residue, but would readily absorb moisture.

2. *Heidemann Powder.*

This is said to be prepared by a modification of the above formula.

Sir Frederick Abel states that this powder has remarkable ballistic properties, furnishes comparatively little smoke, which is speedily dispersed, and is less hygroscopic than any such preparations hitherto made; it also yields a far larger volume of gas and water vapor than black or brown powder, and is much slower in its action, in consequence of which the chamber pressure is lower but the pressures along the chase higher than with ordinary powder.

3. *Chilworth Special.*

This is supposed to be made by a slight variation of the formula given, the charcoal being prepared as in the case of brown powder. It has been used until lately in the Armstrong rapid-firing guns. All cartridges are put up in hermetically sealed metallic cases, containing a cylindrical space through the middle for a priming charge of one pound of large-grain rifle powder. It leaves no residue in the bore sufficient to interfere with the essential requirements of rapid loading. In experimental trials with rapid-firing guns, it proved not to be absolutely smokeless but approximately so, the smoke being nearly transparent and soon dissipated.

CLASS II. *Picrate Mixtures.*

Picric acid is an explosive tri-nitrate of carbolic acid, produced

* Assistant Chemist of the English War Department.

by the action of nitric acid, as represented by the following reaction—

$$\underbrace{C_6H_6O}_{\text{phenol or carbolic acid}} + \underbrace{3HNO_3}_{\text{nitric acid}} = \underbrace{C_6H_2(NO_2)_3OH}_{\text{picric acid}} + 3H_2O$$

This acid has long been a favorable material for explosive experimenters in France, and is the principal constituent of mélinite, a high explosive introduced into the French service in 1886-87 for charging shells. It is a powerful explosive, and its high specific gravity enables a considerable charge to be placed in a limited space. It is also used in the production of an American nitro-cellulose smokeless powder called *gelbite*.

Of its salts, the picrates of potassium and ammonium are the only ones that have been much used in explosive preparations.

$$C_6H_2(NO_2)_3OK \text{ and } C_6H_2(NO_2)_3ONH_4$$

The potassium salt is the best known and most violent in its action. In combination with potassium chlorate it forms a mixture nearly as powerful as nitro-glycerine, but it is so sensitive to friction or percussion as to render it practically useless. With potassium nitrate a less violent combination is obtained. A mixture of this nature was introduced more than twenty years ago in France. It was used for torpedoes and shells, and with the addition of charcoal, for cannon and small-arms powder. Such powders are still being manufactured there for ballistic purposes, being adapted for various arms by varying the percentages of potassium picrate.

The ammonium picrate is less sensitive than the potassium salt. If ignited in the open air, it burns quietly with a strong, smoky flame. If heated, it melts, sublimes and burns without explosion. It is almost entirely unaffected by blows or friction. By a mixture of this with potassium nitrate in varying proportions the *Abel* and *Brugère* picric powders are obtained.

The proportions for the former are given as—

54 pts.	ammonium picrate.
46 pts.	potassium nitrate.

This is stated to be more powerful than ordinary gunpowder, and less violent than nitro-glycerine and gun-cotton. The follow-

ing claims are made as to its advantages: It is insensitive to ordinary means of ignition. If flame is applied, the particles in contact burn, but the combustion does not readily extend to the others. Blows or friction do not explode it. It must be confined in order to develop its explosive force. It does not absorb moisture from the air, so that it may be stored and handled like gunpowder, and is at least equally safe and permanent.

The Brugère powder is said to give high velocities (over 2000 feet with small-arms) and to cause only very slight recoil. It is stated that a large number of cartridges of this powder were ordered for the *Lebel* rifle when that arm was new, but, in 1888 examination of a quantity of this ammunition stored at Chalons showed that the whole lot had to be condemned. The causes of this deterioration are not given, and on this imperfect information it will be useless to try to reconcile this statement with the claims made for the similar *Abel* powder.

Potassium nitrate being present in all these picric powders, there must be, as already stated, smoke resulting from the explosion, though not approaching in density that from ordinary powder.

CLASS III. *Nitro-Cellulose Compounds.*

The nitro-cottons, of which gun-cotton is the most important, are the representatives of this class. Nitro-lignin and nitro-straw smokeless powders also occur to a considerable extent. Starch has the same percentage composition as cellulose, and will furnish a similar explosive by approximately similar treatment.

To avoid confusion, it is well to state here that by the action of nitric acid on cotton, three nitro-products are obtained, depending upon the strength and amount of the acid, time, and temperature. These are represented usually by the following:

Cotton Cellulose——————$_n$ $C_6 H_{10} O_5$

Nitro-Cottons.

$C H_9 (NO_2) O_5$ mono-nitro-cellulose.

$C_6 H_8 (NO_2)_2 O_5$ di-nitro-cellulose.—*Collodion cotton* (soluble in alcohol and ether, or mixtures of same, also to a certain extent, in nitro-glycerine).

$C_6 H_7 (NO_2)_3 O_5$ tri-nitro-cellulose.—*Gun-cotton* (not soluble in above, but soluble in acetone or acetic ether).

The gun-cotton is the most explosive of the three, and the one least likely to spontaneous decomposition. Among explosives, it is unsurpassed as regards the smokelessness of its products of combustion. The reactions are represented as follows:

$2(C_6H_7(NO_2)_3O_5) = 9CO + 3CO_2 + 7H_2O + N_6$ (Cundill.)

$2(C_{24}H_{29}O_{29}(NO_2)_{11} = 24CO_2 + 24CO + 12H_2O + 17H_2 + 11N_2$ (Vieille.)

It will be seen that the resulting products of decomposition are entirely gaseous, with the exception of the water, which assumes the transparent form of highly heated vapor at the instant of its production. If condensed as the gases expand in the open air, the thin resulting haze is found to be quickly dissipated. This fact early drew attention to gun-cotton in the recent efforts to discover a satisfactory smokeless explosive for fire-arms. Its explosion when closely confined as in fire-arms is very violent, however, and in its modern form—pulped and compressed—its effect is usually brought about by detonation. In its earlier history it had been used for a time for ballistic purposes.

Soon after its discovery in 1846, attempts were made to use it in small-arms and field guns by modifying its rate of burning. This was done by varying the compactness of its condition in the charge, depending upon the arm with which it was used.

It was soon found that, owing to some slight unforeseen variations in the materials or in the air spaces, very violent action sometimes took place, showing that the system was quite unreliable. In the earlier days the processes of manufacture were not such as to insure perfect uniformity or chemical stability in the product.

The Austrian Government labored for a time to overcome these difficulties, and thought that success in its use for ballistic purposes might eventually be attained.

In 1865, however, two fearful explosions of gun-cotton magazines occurred in Austria, the causes of which could not then be determined. The use of gun-cotton in that service was abolished, and all existing compounds of like nature were ordered to be destroyed. This rule was followed by all European nations with the exception of England. When, in these later days, however, the eager search for a smokeless powder was instituted, gun-cotton was better known, and through improved processes of manufacture had become thoroughly safe and reliable. There

only remained the problem of controlling its action to insure against the possibility of destructive detonation.

It is held that complete success has been met with in this respect, and the most successful smokeless powders of to-day have as their principal or secondary constituent some form of nitro-cellulose. The nitro-cottons are the forms of nitro-cellulose most commonly used.

The preparation of powders having nitro-cellulose for a base is founded upon the property which this substance possesses of becoming, when treated with a proper solvent, a gelatinous mass easily convertible into sheets, strings or grains, which can by a simple process of drying be freed of the liquid solvent used in manufacture.

The details in most cases are secret, but the general principles are pretty well understood. The gelatinous solution when formed is subject to the action of powerful presses to remove the excess of solvent. The grains are then formed in various ways. The pasty mass may be passed between heated rolls and reduced to any required thickness, the sheets being then cut up into small rectangles. Or, the paste may be pressed through thin metallic plates perforated with holes of any desired diameter and the cord or string-like cylinders cut into proper lengths to fit it for use under varying conditions. Then comes the dangerous process of drying in steam or water-heated ovens, which are provided with outlets for carrying the vapor to receptacles where it is condensed. When thoroughly dry the grain powder is glazed by a process similar to that used with ordinary powder.

While the sheet powder can be obtained of any desired density by regulating the pressure of the heated rolls, this advantage is lost in the grain powder obtained by the second process, as the mass is always forced through the plates under the same pressure. The rate of burning varies with the size and density of the grains, which are very hard, horn-like, and amorphous.

Examples are given of nitro-cellulose powders formed by the nitration of *straw* and the like, and granulation of the resulting products without the use of solvents. It will be seen from the reactions that nitro-cellulose does not contain sufficient oxygen to completely oxidize the C to CO_2. To remedy this, and as slowing agents, oxidizing salts are sometimes added in certain powders of this class.

Examples.

1. *Engel.* 1887. Vegetable fibre or other form of cellulose is nitrated in the usual way. Acetic ether is employed as a solvent, its action being assisted by mechanical kneading in a suitable vessel until a viscid paste is obtained. A certain amount of potassium or barium nitrate is then added, the mass formed into cakes, and the solvent removed by evaporation or distillation. The powder is left as a dense, horny substance which breaks with a hard, glassy fracture.

2. *Turpin.* 1888. A paste is formed by the mixture of trinitro-cellulose with a solution of less highly nitrated cotton in ether, the former being in great part soluble in the latter. Sheets are formed by mechanical means, and these are equalized in thickness by being heated and passed between metal rolls. The solvent is then dried out in the open air, or in an apparatus which permits of its condensation and recovery. The sheets, when reduced to the proper thickness, are cut into strips, cubes, or grains which are assorted by sifting.

CLASS IV. *Nitro-Glycerine and Nitro-Cellulose Compounds.*

It is claimed that when the nitro-cellulose is subjected to the solution process by itself it is very difficult to mould and granulate, and the loss of expensive solvents is considerable; that the grains must be comparatively small to insure prompt and certain ignition, and consequently the pressures developed in the gun are apt to be too great when charges are used sufficiently large to give the desired velocities. This brings us to the fourth and last class of smokeless powders, in which enters as an important ingredient the *king of explosives*—none other than *nitro-glycerine* itself. In this class are found to-day many of the most prominent brands of the new powders.

Some years since it was ascertained by Nobel that soluble nitro-cotton would dissolve in nitro-glycerine, and in so doing fix and gelatinize it, thus making the extremely powerful explosive which has become known and extensively used under the name of *blasting gelatine.* Pursuing investigations on this line, Nobel discovered that by adding a larger percentage of the lower form of nitro-cotton, using a suitable solvent which could afterward be removed by evaporation, and adding a small percentage of camphor to facilitate the process and as a slowing agent, he could produce a gelatine which might be rolled into sheets, cut up into

grains, and dried into a horny substance. These grains were found to be unaffected by moisture, to have lost the tendency to detonation, and were on combustion practically smokeless. By regulating the size of grain and providing suitable means for ignition, the desired ballistic results were obtained and the pressures remained safe and uniform.

By variations in the proportions and processes of manufacture, it is evident that there may be obtained a large number of smokeless explosives under this class.

The permissible range of variation is a wide one, but it is stated that when the proportion of nitro-glycerine exceeds two-thirds of the composition, it is rather too soft, and when the nitro-cellulose exceeds two-thirds, the product becomes too tough and hard to be easily granulated.

The resulting explosive, in any case, differs greatly in many of its properties from either of its constituents, which are the best known and most used of all the so-called high explosives.

The nitro-glycerine being itself a solvent of nitro-cotton, much less of the volatile solvent is necessary to produce the gelatine, which being quite plastic may be wrought or moulded into any desired size or form of grain. With this combination, a quicker and more certain ignition is obtained with a larger grain. The reaction for nitro-glycerine: $2C_3H_5(NO_3)_3 = 6CO_2 + 5H_2O + N_6 + O$, (Cundill),—shows not only that the products of combustion are *smokeless*, but that the oxygen is in excess and that this will make up in part for the deficiency of O in the gun-cotton.

It is claimed that the use of camphor as a slowing agent in the Nobel powders is objectionable, inasmuch as it is volatile and the powders containing it will be affected by temperature and age. It is believed that the inventor has already remedied this difficulty. The Nobel powders seem to be taking the lead at present. Italy, after extended and satisfactory experiments, has adopted one brand under the name of *balistite*, and is believed to be manufacturing it in large quantities. Germany has been testing it for a considerable period, and a modification passing under the name of *cordite* has found great favor in England. Nitro-glycerine and nitro-cotton (collodion cotton) are believed to enter into these powders in about equal proportions. Maxim proposes the substitution of castor oil as a slowing agent, and in cordite tannic acid has been used. Mr. Maxim states that the use of the lower

grades of nitro-cottons in the gelatine powders is objectionable from their want of stability. He substitutes the more stable trinitro-cellulose or *gun-cotton* proper, using as a solvent acetone or acetic ether. With these modifications, he claims that the resulting powder possesses the following desirable qualities:

"1st. It is absolutely smokeless, that is, its products of combustion are entirely gaseous.

"2d. Its products of combustion are in no way deleterious or unpleasant.

"3d. It is perfectly safe to manufacture, handle and transport. There is no more danger of its exploding accidentally than there would be of an explosion of shavings or sawdust; for, unless well confined and set off with a strong primer, it will not explode at all. In the open its combustion is so slow as to in no way resemble or partake of the nature of an explosion.

"4th. It is perfectly stable, and will keep any length of time absolutely without undergoing any change whatever, under all conditions of temperature or exposure to which gunpowder would ever be subjected.

"5th. It is not hygroscopic, and may be soaked in water without being at all affected by it.

"6th. It will not corrode the cartridge case.

"7th. It will not foul the gun.

"8th. It is sure of ignition with a good primer, and may be made to burn as slowly as desired by varying the character and size of the grains. Indeed it may be made to burn so slowly as to fail of complete combustion before the bullet leaves the gun.

"9th. In a shoulder arm, a velocity of 2000 feet per second may be imparted to the bullet with this powder, and with a pressure in the chamber of the gun of not more than fifteen English tons. This is, of course, when the gun, cartridge case, primer, and projectile are adapted to the use of smokeless powder, and the granulation of the powder is adapted to them."

Examples.

Maxim powder. The proportions of nitro-glycerine and gun-cotton are about equal. One formula given is as follows:

50	per	cent.	gun-cotton.
48	"	"	nitro-glycerine.
2	"	"	castor oil.

Methods of Manufacture. 1st. A quantity of high grade gun-cotton is reduced to pulp, and then washed thoroughly to remove the free acid. It is then dried, moistened with acetone, and subjected to the action of a mixture of six parts of ether and one of alcohol until it is partially dissolved. When sufficiently softened, it is either compressed into sheets under heavy pressure or forced through dies to form cords or strips.

2d. To form large sized grains, the pulp is placed in a receiver from which the air is exhausted, the vapor of the solvent then admitted and allowed to act on the mass until it succeeds in partially dissolving it. The mass is then compressed in the receiver to the desired thickness, after which it is removed and cut into the desired shapes.

If the powder prove too quick burning, certain substances which tend to reduce the rate of combustion are mixed with the gun-cotton.

Cordite. Abel's. In this the proportions of nitro-glycerine and gun-cotton vary. As a slowing agent, from 10 to 20 per cent. of "tannic acid" is added.

II. BALLISTIC COMPARISONS.

Regarding the velocities and pressures obtained with the new smokeless powders, the following from published results of comparative tests may prove of interest. It has not been considered of value in any case to give simply velocities claimed. The corresponding pressures must also be known to determine whether or not the same are permissible in the ordinary operations of service: (See table, next page.)

The Hotchkiss Company has lately conducted extensive experiments with samples of the BN smokeless powder. In trying for similar pressures with this and ordinary powders, using service projectiles with six calibres of rapid-firing guns varying from 1 pdr. to 33 pdr., and considerably reduced charges of the BN powder, the muzzle velocities were increased from 164 to 344 feet. This firm seems to consider that the experimental stage for three pounders has been passed, with exception perhaps of that for the small arms. The Krupp experiments have extended over two years, and with reported very uniform results.

It will be seen from these results of comparative tests that the smokeless powders possess far better ballistic qualities than the ordinary powder, much smaller charges being required to produce

equal velocities, while with equal chamber pressures the velocities are as a rule much higher. In its normal state it has a gradual and sustained action, giving lower chamber pressures but higher press-

	Gun.	Charge. Weight.	Projectile. Weight.	Initial Velocity	Chamber Pressure lbs. per sq. in.	Remarks.
Small Arms.	0.″315	Ordinary powder 72.5 grs.	231.5 grs.	1755′	28.000	The variations in velocity did not differ from those obtained with ordinary powder.
	"	Grakrut. 46.8 grs.	"	1965′	32.928	
Rapid Firing Guns.	37mm=1.″4578	Ordinary powder 9 6 ozs.		1808′	25.088	
	"	Grakrut 6 ozs.		2259′	28.896	
	"	Grakrut 7 ozs.		2509′	35.616	
	6″ Armstrong	Brown prismatic 60 lbs.	100 lbs.	2260′	33.600	
	"	Chilworth Special 38 lbs.	"	2340′	36.960	
	"	Cordite.		2300′	26.880+	
High Power B. L. Rifles.	Krupp. 15cm=5.″9+ l=35 calibres	Nobel C/89 16.3 lbs.	112.45 lbs.	1945′	31.584	Foot Tons. Energy per lb. = 181
	"	Nobel C/89 16.1 lbs.	" "	1939′	30.464	" " 182
	Canet. 15cm=5.″9+ l=36 calibres.	B N. 26.4 lbs.	93.9 lbs.	2270′	31.584	" " 127
	Schneider. 15cm=5.″9+ l=36 calibres	B. N. 28.7 lbs.	88.2 lbs.	2325′	30.688	" " 115
	U. S. 8.″	Brown. 130 lbs.	300 lbs.	1935′	37.000	
	" "	German mod. of Nobel's 50 lbs.	" "	2162′	38.000	
	German 8.″27	Nobel 51.7 lbs.	238 lbs.	2329′	32.704	

ures along the chase of the gun. In this connection, Mr. Longridge, the English gun engineer, states as follows: "It is beyond doubt that these powders must supersede ere long the old black

and brown powders, and that quite independently of the advantage of their smokelessness. The most striking feature is that of their vastly superior force." He gives the following comparison: "If therefore the average of the brown powder be unity, the strength of the others will be

Cordite	4.16
Nobel's	3.44
French B. N.	2.48."

This is based on the average energy in foot-tons developed by each pound of explosive, reduced to similar conditions.

As the smokeless powders become firmly established in any service, these changes in pressures will, doubtless, call for changes in future constructions which are to use these powders. These will consist in adapting the powder chamber to the new explosive and in strengthening the walls of the chase; also a possible increase in length of bore.

In the meantime, as a rule, the new powders will be adapted for use in present constructions. To obtain the full ballistic advantages of the new explosives, however, will necessitate new designs. Small-arms will probably require special adaptation.

These published details of competitive trials suffice only to give an approximate idea of the relative values of the old and new powders. To determine these with greater exactness, all the conditions should exactly correspond, especially as to length of travel of the projectile. Data obtained in this exact way will alone suffice to show in what degree ballistical formulæ must be modified. In any event the old powders have the advantage in that the present guns have been adapted to their peculiarities.

Regarding the danger of an occasional excessive pressure, approaching that produced by detonation, most thorough tests with each variety can alone determine.

If such cases have occurred, they have not been extensively advertised. Published results admit some irregularities in pressure with certain brands, and there seems to be some ground for believing that excessive pressures have at times been obtained. In small-arm experiments with various smokeless powders in this country it has been found difficult to obtain uniformity in action except by most careful efforts to secure uniformity in all the conditions of loading. Loading by hand has so far been found necessary to insure this desired uniformity. High chamber pressures have also resulted. It will probably be found necessary to

accept these with the arms of reduced calibre. With these the compressed black powder also gives high pressures. In England the latter was required by specification to give 1810 feet muzzle velocity with 19 tons highest pressure and 18 tons mean pressure. Differences of condition as to measurement precludes any comparison of velocities and pressures obtained abroad, with those given by experimental firing in this country.

Perhaps of the so-called smokeless powders the *Schultze* has been longest in use, having been early adapted for sporting purposes only. It is said to be essentially a nitro-lignin, with a considerable quantity of potassium and barium nitrates. Judging from the controversy about it in sporting papers, it would seem to be irregular and unreliable except when carefully and intelligently manipulated. Still this powder has doubtless been left far behind in the rapid advance of smokeless explosives during the last few years.

Maxim claims that the smokeless powders of the class to which his belongs, cannot be detonated by a fulminating cap of any size or by any means whatever;—that only a large charge of fulminate of mercury placed inside the cartridge case next the primer will serve to ignite and explode it, and even then explosion only takes place when the powder is confined behind a projectile.

In testing with reference to this point, charges should be allowed to remain for a time in heated chambers, extra powerful primers used, and all possible conditions and combination of conditions tried which might by any chance arise in service.

III. STABILITY UNDER VARYING CONDITIONS OF MOISTURE, TEMPERATURE AND AGE.

This quality, in so far as the *ammonium nitrate* powders are concerned, has already been considered; also the effect of allowing any volatile constituent to remain in the finished products.

It was determined, by experiments made in England with several varieties, that though satisfactory in other ways they were not able to retain their normal qualities under the varying conditions of service afloat.

The climatic tests made with *cordite*, however, have been reported as very satisfactory, but are still to be continued in Canada and India. It was also exposed to a very high and very low temperature without being injuriously affected as regards pressure or velocity.

Charges of *balistite* have been soaked in water, dried, and then fired with favorable results. It is believed that other varieties among the third and fourth classes would undergo this test satisfactorily.

IV. FOULING.

With many of the smokeless powders there is almost entire absence of fouling. This cleanliness, which appears at first sight very desirable, has, however, developed difficulty in causing much friction between the bore and projectile.

In the use of *cordite* with small-arms in the English service, the entire absence of fouling and the excessive heat generated caused *metallic* fouling, and occasionally the covering of a bullet was stripped off and remained in the barrel, rendering the rifle unserviceable.

To overcome these serious difficulties, some change was necessary either in the explosive or the bullet.

Various kinds of bullets, lubricated in different ways, were tried, but the results were not wholly satisfactory.

Soft steel and wrought iron were tried as coverings for the bullet instead of nickel, and some slight change was made with the powder. It was found possible to overcome the metallic fouling, but the shooting was then not so satisfactory as that obtained with the compressed black powder or with the Nobel. It is believed that this difficulty will be overcome. Regarding the troublesome wear from *erosion* incident to the use of brown powder, especially in the larger guns, it is thought that this will be considerably reduced in the entire absence with the new powders of the non-gaseous sulphur compounds which form such a feature with the old.

V. SENSITIVENESS.

The new powders are as a rule remarkably unsensitive to explosion from friction or shock. In many cases they fail to explode under conditions which the old powders could in no way withstand.

It has been determined by experiment that *balistite* could be transported without danger. Shots fired into cases of cartridges did not produce explosion, and a cartridge was exploded in a full packet of charged cartridges without exploding the others.

When flame is applied to grains of the Nobel powder in the open air, they burn readily but do not explode.

In England extensive satisfactory experiments were made with Cordite to determine whether or not it could be exploded in large masses by simple ignition in the open air. It was contained in service boxes with a capacity of 100 lbs. each. A small priming charge of gun-cotton failed to explode it. With a priming charge of fine *cordite*, successive boxes were ignited and burned with great rapidity, energy, and brilliancy. In making bonfires of several boxes at a time, as a rule the boxes ignited in succession and burned away non-explosively. In only one case there was a dull, muffled burst, which nearly amounted to a mild explosion.

With many of these powders close confinement is absolutely necessary to produce explosion with force; and even then special care is taken to produce strong ignition. With grains of the nitro-cellulose and nitro-glycerine powders large enough to insure safe pressures, very large and strong primers have to be employed. Something is necessary besides simple ignition. Sufficient pressure must be set up at the start to insure continued burning of the ignited grains, and inflammation of the entire charge. So in certain cases an initial priming charge of black powder or the like is introduced.

VI. MANUFACTURE.

Dangers arising in the manufacture, when not excessive, will probably not deter from the use of explosives either for mining or military purposes. There is necessarily, and always will be, more or less risk in the manufacture of such as nitro-glycerine and its variations in the dynamites; still the production of these for blasting has been enormous.

It has been reported that a large quantity of *balistite* exploded at the Italian powder factory on May 10, 1890, killing many workmen. Whether it was an explosion of the finished product or of the ingredients in the process of manufacture is not stated.

The question of expense will only come in as a factor in determining the selection of an explosive.

VII. PRODUCTION OF NOXIOUS OR IRRESPIRABLE GASES.

The condition that the products of explosion should be comparatively free from noxious or irrespirable gases is deserving of consideration. There would seem to be with most of the compounds but little more danger from the resulting products than in the case of gunpowder.

There will be some slight danger from asphyxia when considerable quantities of any of these explosives are burned in a confined place.

With the nitro-glycerine compounds, if decomposition is not complete, serious poisoning often results in blasting, from the presence in the air of tunnels or other confined places of the unexploded particles of this substance in a state of vapor.

The only evidence in my possession bearing on this point consists of a newspaper rumor to the effect that during certain Austrian manœuvres, "dozens" of the troops were fatally asphyxiated by the poisonous fumes of the powder.

The statement of Captain Walters of the Austrian service, an authority there on these matters, leads to the inference that the newspaper rumor may have had some foundation. He says: "Recent experiments having demonstrated that the gaseous products formed by the combustion of these powders sometimes have an injurious effect upon the human system, various substances, such as nitrates of potassium, barium, ammonium, etc., have been introduced into their composition, which by combining with the injurious products render them innocuous."

Want of time forbids in this paper any consideration of the important matter of tactical changes, both land and naval, which will be necessitated by the general introduction of the smokeless powders. This subject is now receiving much attention in all services as evidenced by current professional periodicals. The prevailing opinion seems to be that many questions which have arisen in this connection can only be definitely settled by a prolonged war between civilized nations.

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THE PRUSSIAN GREAT GENERAL STAFF AND WHAT IT CONTAINS THAT IS PRACTICAL FROM AN AMERICAN STANDPOINT.

By CAPTAIN T. A. BINGHAM, Corps of Engineers, U. S. Army.

ALTHOUGH much has been written about this, now world famous, organization, and although a distinguished member of it, Gen. von Schellendorf, has published the details of its work and methods (translated by Lieut. Hare, Royal Engineers), it is probably not too much to say that this unique corps is still not universally understood, especially in America.

It is true that the term "General Staff" is beginning to be used in the United States Army, but it is in a sense totally different from the Prussian. With us it can refer only to departments which are "general" merely in the sense of having certain duties in charge for the whole army—and these are purely of administration or supply; they have nothing to do with the plan and execution of campaigns.

In fact, the English translation of the name, while strictly correct, is, nevertheless, misleading owing to the different meanings of the word "general" when used as an adjective or as a noun. The proper English name for this corps, in the Prussian sense, is something like this:—Corps of Chiefs of Staff for Commanding Generals, or Corps of specially educated and trained Aides-de-Camp.

The aide may be a personal friend or favorite of the general. But the old idea of the general's "military family" wherein the aides are pets of the general, or more likely, of his wife, and, in times of peace at least do duty mostly in escorting the ladies and carrying their wraps and parasols, will not do in this age of inexorable science. In these days, aides must know something, and not only that, but, in order to keep abreast of the times, they must be specially trained for their duties.

That the phrase given above is a proper equivalent for the Prussian "General Staff" will be evident from a consideration of the duties and training of such Prussian officers. The cleverness

of the foundation idea involved will also be perceived, as well as its far sighted adaptation to modern progress in the art of war.

The underlying idea is like this:—

War is daily becoming more scientific and complicated. Armies and even parts of armies are huge masses of men requiring the highest administrative ability to move them and their indispensable supplies. Huge railway and wagon trains have to be handled. Combatants, horses, and many non-combatants must be fed and kept in condition for instant service; and they and the long trains must be moved hither and thither and must be kept more or less concentrated and yet must not interfere with each other. Provision must also be made for sending wounded and prisoners to the rear and bringing reinforcements to the front. Then the enemy must be found, evidence in regard to him weighed, his movements studied, and finally battles must be fought to which all the rest is merely preliminary.

Yet with huge armies just as much as with former small ones, the general must know all the details and have his army just as much perfectly in hand as before. This is an unchanging principle, yet its unavoidable observance involves a difficulty and complication greater in proportion than the increase in size of armies.

Much as science has progressed of late years, the art of war has kept even pace. The former specialties of military science, technical as well as practical, are now complete sciences in themselves and the special art of generalship, which must utilize all the others to best advantage, has been pushed so far that no longer will the artillerist or cavalryman or infantryman necessarily make a good general. It is more than ever true that a superior personal commander of troops may make a good brigade or division commander but be an absolute failure as an independent army or corps commander. To be a good general now requires not only talent, but special training.

Of course, a general must confide many duties to others and trust to them for details. He must have chief quartermasters, commissaries, etc. But while all good generals have known how to leave their subordinates independent within their own spheres, they have been no less conspicuous for being themselves well informed as to details.

But actual battle, to which all else is subordinate, is the climax of the difficulty. The general must know everything and be

everywhere. He should be ubiquitous. But of what use is a general if you cut him into pieces?

The Prussians have solved this problem by training junior officers in the special science of generalship, which they regard as a very distinct thing from staff or bureau duty or personal command of troops, although requiring a thorough knowledge of all.

These junior officers are then (by orders, not by choice of the general) placed in such close relations to the general and his plans and orders that, while strictly his subordinates and his staff officers, each one is by training a competent representative of the general himself. Most of the Prussian generals have come up in this way through the great general staff, and those who have not have always displayed special talent beforehand for high command. This system involves:

1. Careful selection of the officer, several times repeated, by rigid consideration of his abilities and characteristics, supplemented by competitive examinations.

2. Training—not only in the details of all other commonly called "staff departments," such as transportation, supplies, etc., but in a much wider range covering

Strategy,
Grand and minor tactics,
Modern languages which open up the facts of the enemy's national resources, his peculiarities, his weak points, etc., and finally
Solution of military problems and
Writing of Orders (a more important art than is generally known—the war of 1866 was directed by only three general orders).
Geography,
Military history and

It will be seen that an officer who has passed through such a system is developed and broadened as much as is possible in time of peace, and that he will be able to take broad views of operations, and even to personate the general himself with whom he is in such close relations.

Such officers actually are, then, the general himself, scattered throughout his command and all over the field of operations.

It is to be noted, also, that such qualities are exactly what are not required of good "staff officers" in the present American use of the word, or of the term "general staff," referring to staff departments.

It is to be expected that the "old soldier" or the so-called

"practical" man will argue, and often with much cleverness and an imposing richness of illustration, against so much theoretical training. But these are the days when knowledge and science are indispensable—even in so low an order of war as pugilism; and history shows no finer example of "practical results" than those produced by Von Moltke's machine for making specially trained aides-de-camp. This machine also enabled him to explode the former axiom that a general, to be successful, must be young.

The student in warfare may be sneered at, but he is apt suddenly to command a terrible respect.

While the general national character of Germany may, it is true, be said to be more mediæval to-day than that of any other European nation, her military business is conducted on the most modern and, in fact, American methods imaginable. Tradition no longer counts for much. The only question is "what is best?" and everything that cannot show satisfactory modern and scientific reasons for its existence is abolished. The press is burdened with numberless investigations on all conceivable points of theory and practice which show noticeable depth and logic of thought. It is thought that these facts are not generally apprehended.

It will probably be granted that the military profession, in general, is and always has been very (I had almost said stupidly) conservative. This is quite true in America. Prussia and, no doubt, France too, are notable exceptions and for the same reasons. Prussia, humiliated and writhing under most mortifying and galling national misfortunes at the beginning of the century, threw tradition and custom to the winds and, on new foundations, built up a military system that has shown its superior value by its brilliant successes. This is the result of thought logically carried to its conclusion in accordance with the conditions of the age; and of work that ignored no detail as too insignificant.

It can readily be believed then that the guiding force, the "brain," as it has well been called, of the Prussian army, that is, the General Staff, has not only reduced soldiering to a definite science, but that it stands in the forefront of its specialty as to its scholarly compatriots in other branches of developing science.

That other nations, in adopting the great general staff of Prussia, have got for the most part the letter only but not the spirit of the age, is more than anything else due to the adamantine conservatism and desperate opposition of fossilized military bureaus whose existence or influence would be destroyed

or seriously weakened by the thorough carrying out of this modern scientific provision for the needs of army leadership at the present day.

The lesson of the Prussian general staff is that correct modern army leadership, which means untold economy in blood and treasure, is a specialty which can be learned only by diligent study and hard work.

Of course, the critic must be careful not to be influenced by mere admiration or friendly bias. Because some things in the Prussian army are practical and perhaps adapted to our needs also, it does not follow that everything is. Circumstances alter cases and, in studying foreign military systems, one must always keep clearly before him the world-wide differences of our national conditions from all others.

Fortunately for us, our national existence does not depend on the maintenance of a huge standing army. Our little force of 25,000 men is probably large enough. But, to fulfil its aim, its officers must be most highly competent.

The only excuse at all for the existence of a Government military school in the United States must be the principle that, though we need only a small body of regular army officers in time of peace, American methods demand that they shall be fully equal if not superior to the officers of foreign armies.

It is expected that our army officers shall be competent, in case of war, to exercise high command—to be generals, some of them, at the very commencement of hostilities. Yet few of our younger officers have ever seen a whole regiment or 1000 men together, and fewer still ever saw a brigade in line.

The education given at the Military Academy and at our post-graduate military schools is admirable and in many ways broader than the average military training in Europe. But, while it is true that at our schools some attention is paid to the special science of commanding large forces, it cannot be denied that the training of our officers, in this regard, is not as broad and thorough as in other respects. It is true that we are paying more attention to this deficiency than before; and we have even had summer manœuvres and practice marches, the good effects of which were felt throughout the whole army. But, if all the captains and lieutenants of the line should be called upon for projects for moving troops, for plans for the same campaign on the same map and for the detailed orders for commencing the same, it is not too much

to say that crudity would be the chief characteristic of the solutions given.

Yet training for high command is the specialty which American regular army officers, more than all others, need, and without which their other education—also indispensable—cannot produce its proper effect. The opening history of our late war is thought to be sufficient proof of this.

If it be objected that unpreparedness for land war must ever be a result of our national conditions and that this is compensated for by the blessings of our unique liberty, it may be said, on the other hand, that there is no reason why the training of our officers, who have little else to occupy them, should not be brought to the highest point of perfection, keeping clearly in mind what the outbreak of war would instantly demand of them, leaving no time for preparation; for modern wars are very rapid.

It is thought that our deficiency in this regard can be very greatly reduced if not entirely removed by the use of two *tools* which are adaptations to American conditions of two tools in use by the Prussian Great General Staff.

Resuming two of the points mentioned above, the general staff system may be divided into four parts.

(1.) Selection of the officer.

(2.) Training.

(3.) Kriegspiel or the War Game.

(4.) The collection and digestion of military information.

The first of these we Americans do not need because our conditions demand that *all* our officers shall be the equal of Prussian general staff officers.

The second is more or less thoroughly carried out already in our Military Academy and various army schools of application.

The last two are the *tools* above referred to.

The War Game is not unknown in America but its value is absolutely unappreciated by our highest military authorities. Most of the so-called war games in America are crude inventions and all are incompletely worked out.

It should be enough to excite the intense curiosity and profound study of our military men that the War Game was one of the favorite tools of the great von Moltke.

It is known that all possible wars and campaigns are worked out beforehand by the Prussian general staff. This is done by means of the War Game. Plans are elaborated to the last detail.

Before they are finally approved and laid away till wanted, they are played out on a large scale before the assembled officers of the general staff, the commanding generals of army corps and all other high commanders of every degree, including the Emperor. The whole campaign is explained on the huge maps laid out before the assembled audience. Difficulties are discussed and different solutions played to their conclusions to see how they would come out. Every possible movement of the enemy is carefully thought out, illustrated on the map, and the proper anti-movements adopted. Each commander learns just what is expected of him and his command and goes back to his garrison to perfect both in their parts.

The result is well illustrated by an anecdote. After war had been declared in 1870, von Moltke was met leisurely strolling on the street by a friend.

"I suppose you are very busy now, General?"

"Oh no!" replied von Moltke, "I've nothing at all to do *now*. The work was done long ago and it only remains to execute it."

The War Game depends on statistics of losses of all kinds of troops under all possible conditions of ground and hostile fire, worked out with German thoroughness and accuracy into tables, from the official reports on modern wars. The proper values to be taken from these tables depend on the conditions of map and problem coupled with the throw of dice as the final determining factor.

The apparatus is simple and inexpensive, consisting of 1. Maps on a large scale, generally invented for the occasion; 2. Leaden blocks of various shapes and sizes representing troops; 3. The tables of losses.

Lack of space forbids here any further details. Like all valuable inventions, kriegspiel is simple in itself though numberless in its applications; and it would be found an intellectual fascination for the somewhat, at present, aimless and often misdirected energies of our younger officers, as well as a powerful means for stimulating and making practical the "higher education" of all our officers.

If a definite plan exists for the defense of our country in case of war not a dozen officers are aware of it. Is that American sense? Is it common sense?

It is doubted if there are a hundred American army officers

who have ever given more than a passing thought to even a single section of that problem.

What a clear aim would be given to military study and what a crystallization of American military principles and facts would be accomplished, if, for example, the invasion of Canada should be played out in its numerous combinations, say at the Army and Navy Club in Washington and at the various militia armories throughout the country! Life would stir once more in the hackneyed old bones of "in time of peace *prepare* for war."

The value of kriegspiel depends, however, even in America, upon the use also of the second tool above mentioned. A chisel is a very fine and valuable tool, but would soon be worthless without a whet or grindstone. The collection and digestion of military information is the universal whetstone for the sharpening of all military "tools" whatever. It is the foundation of the science of army leadership.

The value to an army of universal military information rests upon a general principle; which, therefore, cannot be violated without inducing unfortunate results.

In human struggles of every kind it is essential to find out all that can be learned about the resources and difficulties, the abilities and limitations, of the "other side." This is true in business competition, in professional rivalry, in base ball, in boat racing, in horse racing, in prize fighting; and war is no exception to the rule.

Now, we Americans do not keep ourselves "in training" as European nations do. We are not prepared for instant war and never will be. *We don't have to be.* But our policy is always to know exactly what we are going to do in any emergency. This is the only excuse for the existence of military knowledge at all in our peace loving republic. The only excuse for any military organization amongst us must be that we may have a body of men able, in case of war, to utilize our boundless resources to the best advantage and so to make up as far as possible for our lack of preparation.

It has been our boast that, while Europe was spending vast sums of money in military experiments and training, we could at any time step in and take advantage of all the experience so dearly gained. And so we could if we would.

But for twenty years after the end of our war we did nothing of the kind. Through the English periodicals we learned in a

very general way of great advances and improvements that took place from time to time, but of prompt, detailed and expert knowledge of what the rest of the military world was learning we had absolutely none.

At the time of the Afghanistan scare between Russia and England a copy of the latest map of the seat of war was not to be had by army officers from Washington. Our maps had been superseded by others three years later, to be bought anywhere in Germany for less than a dollar, and so recent in their information that the newspaper accounts of movements on both sides could be followed day by day—a rare excellence in a map and only to be fully appreciated by one who has attempted to do it.

The same was true, though not in so great a degree, at the time of the Gordon expedition to Egyyt. Such instances could be many times multiplied.

When now "in the course of human events," and largely owing to the influence of an intelligent and patriotic press, the nation and hence Congress began to stir themselves to remedy our absolute defenselessness on land, one of the first things was to find out exactly how matters stood in the military business throughout the world. Our War Department was naturally turned to for this information and did not have it! Nor is our War Department wholly to blame for this, as could easily be shown.

Then the Boards of Officers, who had matters in charge, had to go abroad, at great expense, to learn how to go to work; thus establishing, in the strongest manner, our need of foreign military information.

Now it is true that one officer or a board of officers, sent abroad spasmodically from time to time, will learn much, because there is so much to learn and see of which we know nothing. But it is not possible for them to learn enough to keep us abreast of advancing progress. Their very ignorance of foreign languages is proof enough of that. These Europeans are "not giving anything away." There is a great deal that simply cannot be got at all, but then there is a great deal that can be got if an officer, properly accredited, comes among these foreign officers, makes their acquaintance in the proper way, shows himself discreet and makes himself a friend. He learns to speak the language thoroughly and gets opportunities for conversation and observation that can be got in no other way, and a discreet American can be talked to, as a European could not be.

In order to utilize information obtained from foreign sources, there must necessarily be some one to receive it, index it, note what has value for America, indicate what specialties America needs information about, and, in short, systematize and direct the whole business of keeping our War Department thoroughly informed as to what the rest of the military world knows or is learning.

Without such a system all the labor of military Prussia would be wasted. Military information is at once the foundation and the sustaining wall of Prussia's instant readiness for war.

It is probably well known that for many years the Prussian General Staff have collected maps, statistics, consular reports, books on travel, etc. They have been sending officers all over the world quietly travelling and filling their note-books with information on harbors, rivers, water and land facilities of transportation, resources of nations in food supply, manufactures, metals, money, etc.; also on the weaknesses and peculiar characteristics of nations. Every publication that could possibly be of use in any branch of information, no matter in what language or in what part of the world it appears, is bought and brought to Berlin.

Here appears the advantage of teaching officers to read modern languages. All the information of the world is an open book to the Prussian General Staff.

It is not strange that America should be lacking in its military development or that Prussia should be so far advanced. But it would not readily occur to one that Prussia's military strength lay in a freedom from tradition, a broad grasp of the conditions of the age and a common-sense directness of action which are truly American.

We do not need a Prussian General Staff, but we do need military information. We need to follow, step by step, all technical advances in treatment of metals, armor, cannon, rifles, gun-carriages and the numberless other details of the military business, in order to profit by them in our own practice and requirements. We need information about the tendencies of the science on land, in tactics, for example; and, on the water, in types and armament of ships, their draught, etc.

We need, in short, prompt and expert "news" of the military life of other nations; and this is at once the reason for and the business of our Bureau of Military Information.

We are now getting a few modern guns and other equipments. We are looking up the subjects of smokeless powder and torpedoes with a view to being a little less foolishly defenseless. Here the Bureau of Military Information is almost daily furnishing hints, explaining difficulties, telling the experience of others and in every way saving expense to the United States by preventing waste of time and money; while at the same time keeping us informed of the strength and capabilities of possible adversaries.

This bureau exerts also a great passive influence throughout the army by opening a field for and encouraging linguistic and scientific study, thought and invention.

The Bureau of Military Information is, in short, the cheap and practical application to our military needs of what is practical to us in the Prussian Great General Staff system which is at once the cleverest and the most successful military invention of our age.

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ARTILLERY SERVICE IN THE WAR OF THE REBELLION.

By BVT. BRIG.-GEN. J. C. TIDBALL, U. S. Army.

(*Continued from* JOURNAL, *No.* 57.)

V. GETTYSBURG (*concluded*).

WHILE Sickles was establishing his corps, in the manner just described, Longstreet, quite unaware of such disposition, was moving two of his heavy divisions around towards Little Round Top to feel for the Federal left flank, and thus unconciously enveloped the salient at the Peach Orchard. This movement brought one of his divisions, that of Hood, in front of Birney and the other against the Peach Orchard. Humphreys' Division was confronted by Anderson's Division of Hill's Corps. Pender's Division of the same corps, on the left of Anderson, confronted that part of Cemetery Ridge held by the Second Corps.

Hood, McLaws, and Anderson had, together, 59 regiments; opposed to these Sickles had but 37 regiments; so that in point of numbers alone, to say nothing of the disadvantages of his faulty position, the latter had but little showing for successful resistance. After the battle had commenced, division after division from other corps were sent in to the assistance of the Third, but all fighting under the same disadvantages, were finally forced back and a new line established on Cemetery Ridge, where it should have been in the first place.

The enemy recognized in Little Round Top the key of the position on that flank. Hood was therefore directed to work around in that direction and gain possession of it. McLaws was to move upon the Peach Orchard, and attack Birney's right and Humphreys' left, while Anderson was to hold his division in readiness, and attack Humphreys in front as soon as Longstreet's attack was fully developed. Anderson was supported by several battalions of batteries, while other battalions extended still further towards Hill's left; thus bringing about two-thirds of Lee's entire artillery force against the ridge between Cemetery Hill and Little Round Top.

Hood's Division was accompanied by Henry's and Alexander's battalions of batteries; McLaw's by Cabell's battalion. The batteries of these battalions were posted in such manner as to enfilade both sides of Sickles' angle and to have a concentrated fire upon the whole of his position. The exact positions of most of these batteries were screened from view of the Federal batteries by intervening trees, but Sickles' position was such that wherever the shots of the enemy fell they were pretty certain of doing damage. In this the Federal batteries were at great disadvantage. It was only occasionally that those on Birney's front got a fair chance at the batteries opposed to them, but when they did they made the enemy suffer.

About 3.30 P. M. Hood's columns, until now sheltered from view by keeping in rear of Seminary Ridge, were observed moving to their right across the Emmitsburg road towards Little Round Top. Clark's battery in the Peach Orchard at once opened on them; this fire was promptly returned by batteries in the open fields near the road, and from other points, and soon the cannonade became furious. The Confederate reports represent their batteries as suffering severely from it, but their suffering was little compared with that of their opponents, whose batteries were being enfiladed. As fast as the latter were disabled they were retired and replaced by others from the Reserve.

About 5 P. M. the enemy moved forward his infantry *en masse*, making his first attack on Birney's left, which was held by Ward's Brigade, a portion of which, a mere skirmish line, rested on the knoll held by Smith's battery. Smith, seeing the danger confronting him and appreciating the advantages of the position, requested additional infantry support, but before this could arrive, the enemy, sheltered by the rocks, made their way to the knoll and captured three of his guns. The enemy, overlapping this flank by his superior numbers, worked his way among the rocks and bushes to the wooded depression or pass between Little Round Top and its neighbor, Round Top, with a view to gaining possession of the former, unoccupied as yet by the Federals. At this critical moment, General Warren, chief engineer on General Meade's staff, having ascended Little Round Top for the purpose of observation, perceived Hood's long line of infantry approaching and overlapping Birney's left in front of the mountain, and knowing that unless prompt measures were taken this vital point must soon fall into the hands of the enemy, he hastened to the

first troops within reach, which happened to be Barnes' Division of the Fifth Corps, then just going into action to the assistance of Birney's yielding line, and from it obtained Vincent's Brigade, with which he hurried back to the crest of the mountain, which was reached just in time to meet, with the bayonet, the enemy who by this time was gaining the summit from the other side. The contest here soon became furious and the rocks alive with musketry. Hazlett's battery of the 5th U. S. Artillery, supported by O'Rorke's Regiment of Weed's Brigade, was sent to the support of Vincent, who was now exposed to a severe fire from the batteries of the enemy. Hazlett's guns were dragged by hand, with great labor, through the rocks and bushes to the crest of the mountain, from which position they opened a fire represented by the enemy as being exceedingly damaging to them, taking them, as it did, in flank. Several of their batteries were turned upon the hill to subdue Hazlett's fire, which they failed to accomplish. A section (platoon, as now called) of Gibbs' Ohio battery took position on Hazlett's right and did excellent work ; the other guns of the same battery were on a projecting spur still further to the right and lower down.

It was Law's Brigade of Hood's Division that made this bold attempt to secure Little Round Top. Being repulsed, Law renewed the attempt at several places. The contest was among rocks and bushes, and often hand to hand ; it was not a momentary dash, but one prolonged until the assailants were finally beaten back at every point, and with a percentage of loss seldom met with in battle. Hazlett, who had displayed such energy in getting his battery to the top of the butte, was killed, as was likewise Weed, who had accompanied O'Rorke's Regiment, and who, too, was killed. Weed, it will be remembered, had won his star only two months before by his energy in collecting the scattered batteries at Chancellorsville and by his judgment and skill in posting them so as to hold a new line and restore order on that unfortunate field. It being supposed at the War Department that general officers were not needed for artillery commands, he was assigned to a small brigade of infantry. Vincent, who so gallantly led his brigade to the top of the hill and fought it with unsurpassed vigor, was also killed, as were many others of lesser note. As severe as was the Federal loss on this hill that of the Confederates was much greater. But the heaviest fighting of the day, both in point of numbers engaged and in the prolonged in-

tensity of the contest, took place among the rocks and woods in front of Birney's position, between Little Round Top and the Peach Orchard. The Federals, bringing up fresh divisions, pressed back for a time the enemy through the rocky recesses of the "Devil's Den" and the surrounding woods, where the battle surged back and forth with bloody fury. This ground was, however, too rough for batteries, which were forced to remain on the line as originally formed; but from this line they did excellent work according to the reports of the enemy, not only during the preliminary cannonading, but at opportune intervals during the battle. When the Federal infantry was finally driven back, some of these batteries were ordered to hold their ground to the bitter end, and to hold the enemy in check until the remainder could withdraw and establish a new line. Conspicuous in this forlorn-hope duty was Bigelow's and Phillips' Massachusetts batteries, both of which lost heavily in men and horses. Bigelow's had three officers out of the four present, placed *hors de combat*.

When it became evident that Birney could not withstand the force in front of him, Barnes' Division of the Fifth and then Caldwell's of the Second Corps were sent in and the fight waxed fiercer than ever. But the farther these supporting divisions advanced against Hood the more were their right flanks exposed to the attacks of McLaws, and they suffered accordingly. Caldwell, under cover of the artillery, extricated his division, only after heavy loss. He had penetrated through the strips of woods to the fields beyond and only needed support to have made a permanent lodgment against the enemy. Ayres' Division of the Fifth Corps, composed chiefly of regulars well commanded, followed closely upon Caldwell, but this division, too, was struck in flank and, although fighting desperately, had to fall back, with a loss of about fifty per cent. in killed and wounded. Ayres' withdrawal was likewise covered by the artillery and by the advance of some of the Sixth Corps which had arrived after a long forced march only a short time previous. The last advance to hold the enemy in check was made by the Pennsylvania Reserves, a division of the Fifth Corps, commanded by Crawford. The charges made by the two brigades of this body were exceedingly gallant, and resulted in retrieving, for a time, some of the lost ground. As a rule the Federal divisions had entered the fight in succession, and were driven back in detail; a result always following when there is no wing or other common commander present to insure coöperation

and unity of action between parts of various corps engaged at the same work.

But the inherent weakness of the Peach Orchard position was such that no amount of fighting could have held it against the forces Lee was bringing against it. Birney's face of the angle was completely broken and driven back to a new line—the line of Cemetery Ridge. The infantry was much confused by the severe work it had gone through with among the rocks and thickets of the ground over which the battle had surged, but the batteries, or remnants of batteries, by being promptly established upon the new line, afforded divisions, brigades, and regiments a firm and well-marked line upon which to form, and their fire held the enemy in check until the line could be well established; after which there was no further danger.

While the fighting was going on against Birney's line, that of Humphreys' was not seriously attacked in front, but suffered greatly from flank and reverse fire from the left. Lee's plan of battle was for Anderson, of Hill's Corps, to take up the attack as soon as Longstreet should break the left. Accordingly, when the Peach Orchard fell, Anderson made his assault upon Humphreys, who was still holding on to his position on the Emmitsburg road. Humphreys was now called upon to resist, with his small division, Longstreet upon his left and Anderson in front. Hancock, now in temporary command of that part of the line, threw in four regiments to support Humphreys' right, but the attack of the enemy was so sudden and violent as to afford them time for but a few volleys before Humphreys received orders to give up his advanced position and fall back to the new line. The batteries on Humphreys' line held the ground as long as possible to cover the withdrawal of the infantry, but the enemy pressing on closely got temporary possession of most of the pieces of several of the batteries. The fire from the new line became, however, so hot, the enemy was forced to hastily abandon pursuit and leave his captures behind. During the night the guns were brought in; all except one, which the enemy succeeded in carrying off.

Three of Anderson's brigades fought their way up almost or quite to the new line, but, being unsupported by the rest of the division, were driven back. Wright's Brigade, the one most in advance, was met by Webb's and Hall's brigades of the Second Corps, which not only repulsed it, but followed it up for some

distance, re-capturing from it a gun that was being used with effect upon the Federal troops, together with several hundred prisoners.

The left brigades of Anderson's Division having failed to advance, the adjoining division, that of Pender of Hill's Corps, did not move to the attack according to the plan of battle prescribed by Lee, which was, that the attack should be taken up successively, from right to left, until his entire line should become engaged. This break in the plan of attack occurred at the most critical period, and undoubtedly had a most decided influence upon the fortunes of the day.

At this period of the battle not only the Third Corps had been driven back from its unfortunate position at the Peach Orchard, but likewise all the troops sent to its assistance.

All had made their best fight, and found themselves unable to hold a long stretch of line now in possession of the enemy. This gave to the Federal troops the appearance and feeling of defeat, and it was difficult for them to realize, upon the spur of the moment, that in their new position they were, in fact, stronger than before. On the other hand the enemy was proportionally elated and confident, and was following up his success with vigor when he met with such resistance as to check his efforts. The most critical moment of this period was when Hood's and McLaws' troops, flushed with the success they had met with, were pressing forward to make victory complete by a clean and permanent break through the left of the Federal position on Cemetery Ridge. But here they encountered the fire of the guns that the artillery commanders were putting in position for the establishment of a new line, and being arrested by it, the check thus given became the turning point of the battle and, perforce, of the rebellion.

When matters were looking so very ominous on this part of the field, troops from every available part were ordered up to assist in repulsing the enemy. Among these was Stannard's Brigade of the First Corps, which made a gallant charge, driving the enemy back and re-capturing several pieces of artillery. This brigade remained upon this part of the line and took an active part in repulsing the great charge of the following day. At the same time a division of the Twelfth Corps was withdrawn from the extreme right on Culp's Hill, and sent over to the left. Owing to the curve in the line of battle around Cemetery Hill

this distance was not very great, and one brigade, that of Lockwood, arrived in time to take part in the fight. During the absence of this division from Culp's Hill, Ewell's troops took possession of its intrenchments and held them until driven out on the following morning.

It was quite dark when the battle closed upon the left. The enemy withdrew to Seminary Ridge, but bending his extreme right forward, still threatened Little Round Top. The battle of the day had been extremely sanguinary and exhausting. It was, in fact, Lee's supreme effort, and in it he put as much force as he could command. The energy thus expended, weakened his power for attack on the following day. Upon the Federal side it had the effect of demonstrating the natural advantages of the position for a defensive battle. It clearly defined the line of greatest strength, and brought the troops upon it in readiness for the contest of the next day.

The guns that had fallen into the hands of the enemy temporarily, were restored to their batteries, and all the batteries that had suffered in the fight were made as whole as possible. The system of brigading the batteries enabled this to be done with promptness and thoroughness. The batteries of the Sixth Corps,—eight in number,—the corps being supposed to be in reserve, were temporarily attached to the Artillery Reserve thus making them more available for general service, and they came in very conveniently to replace batteries damaged by the fire of the enemy.

Lee's plan of battle contemplated, as before stated, that while Longstreet made the principal attack on Meade's left, Ewell should make a simultaneous demonstration on his right, to be converted into a real attack should opportunity offer. Hill, whose corps was between Longstreet and Ewell, was to support both of them as soon as occasion might offer. We have just seen that Anderson's Division, or rather a portion of it, gave prompt and decided assistance to Longstreet, and that it was only by the laggardness of one of his brigade commanders that the attack was not continued along the line, and to include Pender's Division also. Heth's Division, on the left of Pender, was to assist Ewell.

Ewell's plan of attack was for Rodes' Division to advance through the town directly upon Cemetery Hill. Early was to advance his division upon Rodes' left, while Johnson's Division,

extending still further round to the eastward, was to attack the position held by the Twelfth Corps on Culp's Hill. It will be remembered, at this point, that all of the Twelfth Corps except Greene's Brigade had been withdrawn to assist in the repulse of Longstreet from the left, a fact, however, not known at the time to Ewell, or even to Johnson. The latter, preparatory to his attack on Culp's Hill, posted Latimer's battalion of batteries on a hill further to the eastward and beyond Rock creek, from which a spirited fire was opened from all the guns, and was replied to by the Federal batteries on Cemetery and Culp's Hills. Johnson says of this: "The terrible fire of the enemy's artillery, rendered his [Latimer's] position untenable, and he was ordered to cease firing and withdraw all of his pieces except four, which were left in position to cover the advance of my infantry. I then advanced my infantry to the assault of the enemy's strong position—a rugged and rocky mountain, heavily timbered and difficult of ascent; a natural fortification, rendered more formidable by deep intrenchments, and thick abattis."

Before his brigades had crossed the creek it was dark, nevertheless he attacked with vigor and spirit. Greene's Brigade, the only one left when the Twelfth Corps withdrew, made a stout resistance and held fast that portion of the line occupied by it, but the enemy took possession of the remainder without much opposition. While Johnson was advancing to the assault his troops suffered greatly from the artillery fire from the batteries on Cemetery Hill; one of his brigades was broken by it and sent in disorder to the rear. A portion of his attack fell upon Wadsworth's Division of the First Corps, intrenched on Greene's left; this attack was repulsed without much loss to the defenders, but with great slaughter to the assailants. During this engagement, which lasted about three hours—well up into the night—Greene was reinforced by several regiments from the First and Eleventh Corps, all of which did valuable service in assisting to prevent the enemy from gaining the whole of Culp's Hill. Immediately after the repulse of Longstreet, that portion of the Twelfth that had been withdrawn from Culp's Hill returned, and preparations were made to rout Johnson from that part of the line which he had taken possession of during its absence. This, however, was not to be done until daylight next morning, and therefore properly belongs to the operations of the 3d.

Early, whose division was on the right of Johnson's, was or-

dered to advance on Cemetery Hill as soon as Johnson should be fairly engaged; and this he did with punctuality, preceding his movement by a fire from all the batteries of his division. His guns were, however, soon silenced by the greater number on Cemetery Hill. Hays, who commanded Early's leading brigades, says: "A little before 8 P. M. I was ordered to advance with my own and Hoke's Brigade on my left, which had been placed for the time under my command. I immediately moved forward, and had gone but a short distance when my whole line became exposed to a most terrific fire from the enemy's batteries from the entire range of hills in front and to the right and left; still, both brigades advanced steadily up and over the first hill, and into a bottom at the foot of Cemetery Hill. Here we came upon a considerable body of the enemy, and a brisk musketry fire ensued; at the same time his artillery, of which we were now within canister range, opened upon us, but owing to the darkness of the evening, now verging into night, and the deep obscurity afforded by the smoke of the firing, our exact locality could not be discovered by the enemy's gunners, and we thus escaped what in full day could have been nothing else than horrible slaughter." The considerable body of the enemy mentioned by him was von Gilsa's Brigade of the Eleventh Corps, stationed in front as an advanced picket. Directly in its rear was a knoll, projecting from the main hill, upon which were posted Wiedrich's N. Y. and Ricketts' Pennsylvania batteries. Von Gilsa's thin line made but slight resistance to Hays' brigades, and passing rapidly to the rear, opened the way to the two batteries, into which the enemy rushed. Ricketts says of this: "The cannoneers fought the enemy hand to hand with handspikes, rammers, and pistols, and succeeded in checking them for a moment, when a part of the Second Corps charged in and drove them back. During the charge I expended every round of canister in the battery, and fired case-shot without the fuses." The other battery had the same experience. While the enemy were among the guns of these batteries, those upon the hill above and back were compelled to withhold their fire; otherwise Hays' brigades would have been torn to pieces. As it was they suffered terribly. Early's other brigades shrunk back from the artillery fire and, getting but little way up the hill, did not come within musketry range. The repulse of this formidable assault was almost entirely by the artillery. The part of the Second Corps mentioned by Ricketts, was Carroll's Brigade, sent

from the other side of the field. It continued in this position and did not therefore participate in the repulse of Pickett's charge of the next day.

Rodes was to have advanced his division simultaneously on the right of Early's, but as he was obliged to march out of the town, before forming line, did not get fairly started up the hill before Early's attack had been repulsed. Rodes was to have been supported on his right by one of Hill's divisions, but it did not come into action because of Rodes' inability to do so.

Ewell's assault, although intended to have been simultanous with Longstreet's attack, was not even commenced until the latter had been repulsed. This was caused in a great measure by the failure of Ewell's artillery to shake that upon Cemetery Hill, and open the way for the advance of his infantry columns. About the time that Longstreet was to attack, Ewell had a battery of ten guns (four 20-pounder rifles and six rifles of lesser calibre) established in a field to the north and east of Cemetery Hill, and within easy range, from which was opened a remarkably accurate fire upon that position. In a short time these ten pieces, having suffered severely in men and horses from an equally accurate fire from the batteries on the hill, were forced to withdraw. Attempts were made to establish other batteries further to their right, but these, exposed to a still greater number of guns, were soon driven off, not however without having inflicted considerable injury to the batteries on the hill. This manifestation of the strength of the position on the hill evidently caused Ewell's troops to look upon its assault in the light of a forlorn hope, and caused his commanders to substitute desperation for alacrity. When finally, about sun-down, his troops were ready to advance, his batteries again opened; but while inflicting considerable damage, were unable to impair the deadly effect of the artillery fire from the hill. The assaults were then made with the results just described.

Ewell's operations of this afternoon go to show most forcibly the difficulty of securing synchronous action on an extended field of battle. An apparently trifling circumstance prevented Rodes from assaulting the hill at the same time with Early, thus losing what was hoped to have been gained by simultaneous action.

This was the last assault made upon Cemetery and Culp's Hills; the troops occupying these were, however, exposed throughout the following day to frequent outbursts from the batteries of the

enemy, while a spiteful skirmish firing was indulged in all the while by the infantry.

While these events were happening on the flanks of the two armies, the centre was by no means idle. The Second Corps, under Hancock, occupied that part of Cemetery Ridge adjoining the Hill, extending along the ridge towards Little Round Top, where its left was to connect with the right of the Third; but when the latter was moved to the front—to the Peach Orchard—an interval occurred which was partly filled by stretching out the left of the Second. When Caldwell's Division was sent to assist the Third, a still greater gap was created, which was subsequently partly filled by Stannard's Brigade of Doubleday's, and the remnant of Robinson's Division of the First Corps put in at intervals. Along this attenuated line of the Second its five batteries were distributed by Captain Hazzard, chief of artillery of the corps; to which were added two other batteries from the Artillery Reserve. While the battle was raging about the Peach Orchard and Ewell was assaulting the right, the batteries of Hill's Corps maintained a furious cannonade upon this part of the line, to which Hazzard's batteries made good reply. All day a brisk skirmish firing was kept up, occasionally swelling with volleys of musketry, approximating to a battle, and when Humphreys was forced from his position on the Emmitsburg road with the enemy following close after, it was Hall's and Webb's brigades of the Second that met and thrust back his foremost brigades when they were upon the very point of breaking through the Federal line.

The foregoing are the general features of the battle of the second day, which, taken as a whole, was by far the heaviest fighting of either of the three days, and the most critical to the Union cause. In it a large part of the Federal artillery had been engaged, and did work, the nature and value of which has been but faintly portrayed in the foregoing. Neither the infantry nor the artillery, if alone, could have saved the field; it was only by their happy coöperation that this was done, and it is but fair that the artillery should receive due share of credit for its part.

The brigade system, notwithstanding its newness, worked admirably. By it the batteries were kept in hand, and brought to their work to the best advantage. Division and brigade commanders were not hampered by the care of them, but were enabled to give their undivided attention to their more legitimate

duties, and it is but logical to presume that the good fighting done by the infantry was largely due to this fact.

Many of the batteries had suffered severely during the day's battle; and the night following was devoted, in great part, to repairing damages, replenishing ammunition chests, and reducing and reorganizing such batteries as had lost so many men and horses as to be unable to work efficiently the full number of guns. Batteries too much disabled were withdrawn and replaced by others from the Artillery Reserve. Otherwise there was no material change in the position of the artillery.

Lee's net gain by his ponderous and sanguinary assaults of this day was the line of intrenchments on Culp's Hill, taken possession of by Johnson's Division when the Twelfth Corps withdrew to assist on the left. The Peach Orchard position, it is true, fell into Lee's possession, but as this was a false position from the beginning, its loss was not a gain to Lee, but in reality an advantage to Meade. Lee, mistaking this for a real gain and overestimating the value of the line of intrenchments captured by Johnson, was encouraged to make similar assaults on the following day, and so ordered. In this however he was opposed in judgment by Longstreet, his chief lieutenant, who probably had better opportunities of knowing the exact condition of things on Lee's extreme right, and how they affected the centre and other parts of the field.

Daylight of the morning of the 3d found the Federal artillery disposed as follows: — Muhlenburg, chief of artillery of the Twelfth Corps, had 20 pieces in position ready to assist his corps in ousting Johnson from the position he had gained the evening before on Culp's Hill. Wainwright, of the First Corps, had 24 pieces on Cemetery Hill on the right of the cemetery gate; while Osborne, of the Eleventh Corps, had 46 pieces on the left of the gate. Hazzard, of the Second Corps, had 38 pieces on that part of Cemetery Ridge occupied by his corps. On the left of these McGilvery had some 40 guns of the Artillery Reserve, and on the left of these were several batteries of the Fifth and Third corps, while twelve pieces still crowned Little Round Top, making, altogether, about 200 pieces in position along the line. All surplus batteries were with the Reserve, which was at a central point, behind Cemetery Ridge, in readiness to afford assistance to any point endangered. Near it was the Sixth Corps, held in like manner as a support to any point of the line.

The question of artillery ammunition was now giving Hunt and others great concern. The management of artillery ammunition trains was not yet under control of the artillery, and many of the wagons carrying ammunition had been sent back, as impedimenta, to Westminster. The ammunition train of the Artillery Reserve, so frequently before called upon to supply deficiencies arising from similar causes, had already been drawn upon until the supply was becoming alarmingly low. There was, however, sufficient to replenish fully all the batteries, and all artillery commanders were cautioned to be as economical as possible in the use of it.

Lee in his report says of his plan of battle for this day (July 3d):—"The results of this day's operation [July 2d] induced the belief that with proper concert of action and with the increased support that the position gained on the right [the Peach Orchard] would enable the artillery to render the assaulting columns, we should ultimately succeed; and it was accordingly decided to continue the attack." His general plan remained unchanged. Longstreet was to attack, as before, on the extreme right, Ewell on the left, while Hill, in the centre, assisted both.

In pursuance of this plan Longstreet made arrangements to conduct the attack in such direction as would enable him to work his way around the Round Tops and thus gain a position in rear of Meade's left. This, if carried out, would have given the field to the Confederates; but other things were now happening to change this programme. Ewell, in renewing his attack of the previous day, was expected not only to hold that which Johnson had already gained on Culp's Hill, but to break up the whole of Meade's right, and then, cutting across the rear of the Federal position on Cemetery Ridge, to coöperate with Longstreet and Hill in making a clean sweep of the whole position.

Johnson had been strongly reinforced during the night, and at daylight attempted to move forward so as to gain a position for his artillery, but was met by Slocum with the Twelfth Corps, assisted by Wadsworth's Division of the First, when a severe contest ensued, lasting until about 10.30 A. M., when the enemy was driven from the hill, across the creek and to the position occupied by him before he commenced his attack of the day before, and with a heavy loss in killed and wounded, together with about 500 captured in addition to the large number of wounded left on the field. Johnson's Division was the one formerly com-

manded by "Stonewall" Jackson, and as it had not been accustomed heretofore to reverses, its well-known bravery took, on this occasion, the form of desperation. The four batteries of the Twelfth Corps, together with one from the Reserve, being advantageously posted, contributed largely to this repulse of the enemy. The reports of the latter all make special mention of the damage done them by the artillery fire.

Walker's Brigade of Johnson's Division was detained away from the attack of the evening before by the presence of Gregg's cavalry, then stationed well around on the right towards Hunterstown to prevent Stuart with his cavalry from raiding on that flank of the army. The demonstrations made by Gregg caused Johnson to detach Walker to hold Gregg's cavalry in check, resulting in a spirited contest between a portion of Walker's infantry and some of Gregg's cavalry dismounted and acting as infantry. This skirmish was of little moment *per se*, but it served to withhold an important part of Johnson's command at a moment when he most needed it.

Gregg, remaining near this position during the night, was in position next morning (July 3d) to meet and drive back the Confederate cavalry under Stuart, which made a bold push to get around Meade's extreme right for the purpose of raiding his ammunition trains and of harrassing his rear. An obstinate fight between the opposing cavalries here took place, not of such magnitude perhaps as some other cavalry battles, but certainly of great moment to the welfare of the Union cause. In it the horse batteries of Randol and Pennington took an unusually important part; in fact so much so that without them Stuart would probably have gained his object.

While Johnson was being driven from Culp's Hill, Longstreet was making his best efforts against Meade's left, but at every step was meeting with such opposition as to convince him of the futility of such an attempt. Failing on both flanks to make the impression he had expected, Lee suddenly changed his plan to a concentrated attack upon the centre of Cemetery Ridge; and, directing Longstreet to suspend his operations against the flank, made preparations for carrying out his new scheme. The assault was to be made by Pickett's Division of Longstreet's Corps; a division that had arrived too late in the evening before to be engaged in the battle of that day, and was therefore entirely fresh. It was moreover a veteran division and one of the best in the

army. Pickett was to be supported on his left by Heth's Division of Hill's Corps, now commanded by Pettigrew, Heth having been wounded in the fight of the first day. Pettigrew was in turn to be supported by two brigades of Pender's Division, also of Hill's Corps.

Pickett's division was to stand the brunt of the assault, or rather to be the head and front of it. Anderson's Division of Longstreet's Corps was held in readiness to support Pickett. The division of the latter consisted of 15 regiments containing about 8000 men; all Virginia troops of the first quality. Pettigrew had 17 regiments, all greatly depleted by the battle of the first day and by subsequent skirmishing; his command did not therefore number over 6000 men. Lane's and Scales' brigades of Pender's Division had, together, ten regiments containing about 4000 men, making a grand total of about 18,000 men present in ranks to move forward to the assault; certainly a mighty mass of force, but yet a very great tapering down from the still mightier efforts made by Lee on the previous day. This however had the advantage of being an attack of one mass, while that of the day before was by different parts of his army at various points and not entirely simultaneous. Against this advantage was the very great disadvantage of having to move this large mass of men nearly a mile over open ground, exposed the whole distance to the direct, cross, and enfilading fire of a numerous artillery, and then to the musketry of a strong line of infantry.

Longstreet upon the right of the attacking line, and Hill upon the left, were to hold the remainder of their corps in readiness to take advantage of the break which was expected to be made in the Federal line, and by pressing forward their troops were to rend asunder the wings of Meade's army.

In execution of this bold project, Pendleton, Lee's chief of artillery, posted the battalions of batteries of Longstreet's and Hill's corps in the edge of the woods along Seminary Ridge and towards the Peach Orchard, in such manner as to have a converging fire upon that part of Cemetery Hill to be assaulted. At the same time, "orders were given," says Longstreet, "to Major-General Pickett to form his line under the best cover that he could get from the enemy's batteries, and so that the centre of his assaulting column would arrive at the salient of the enemy's position. General Pickett's line to be the guide and to attack the line of the enemy's defenses, and General Pettigrew, moving on the

same line as General Pickett, was to assault the salient at the same moment." The *salient* here referred to was really no salient at all, but a part of Cemetery Ridge which, in consequence of a swell of the ground, appeard to the Confederates as such. The line from Cemetery Hill to Little Round Top was virtually a straight line, with but slight irregularities. Pickett and Pettigrew formed their divisions in two lines with a front of two brigades each.

Lee's battalion system enabled his chief of artillery to assemble his batteries and post them with promptness. The same system, although so new to the Army of the Potomac, enabled Meade's chief of artillery to handle his artillery with a promptness and efficiency before unknown to that army. Under the old system of having batteries distributed to infantry divisions without any special commander, the decisive blows given by the artillery to the assaulting column would have been quite out of the question and the final result of the battle extremely doubtful ; it would probably have been, as many previous battles of the Army of the Potomac had been, either an out-and-out defeat, or, at best, but a Cadmean victory.

While these preparations were in progress, Kilpatrick, with Merritt's and Farnsworth's brigades of cavalry and Graham's and Elder's horse batteries, was working his way around Longstreet's right, with a view of reaching the ammunition trains of the enemy which were in that vicinity—a counterpart of Stuart's operations so handsomely checked by Gregg as has just been mentioned. Kilpatrick's movements diverted a large part of Longstreet's force from either supporting Pickett or attacking Little Round Top, which he hoped to carry while the Federal troops had their attention turned towards Pickett's attack. Kilpatrick, although making a gallant fight in which Farnsworth was killed, was unable to make headway against the heavy force of infantry and Henry's battalion of batteries sent against him, and was obliged to fall back without having damaged the ammunition train further than to cause its hasty removal, thus greatly inconveniencing the enemy in distributing the ammunition to the troops.

" At length," says Pendleton, " about 1 P. M., on the concerted signal, our guns in position, nearly one hundred and fifty, opened fire along the entire line from right to left, salvos by battery being much practised, as directed, to secure greater deliberation and power. The enemy replied with their full force. So mighty

an artillery contest has perhaps never been waged, estimating together the number and character of the guns, and the duration of the conflict. The average distance between contestants was about fourteen hundred yards, and the effect was necessarily serious on both sides. With the enemy, there was advantage of elevation; but his fire was unavoidably more or less divergent, while ours was convergent. His troops were massed, ours diffused. We, therefore, suffered apparently much less."

Hancock, in describing this cannonade, is even more graphic. He says: "From 11 A. M. until 1 P. M. there was an ominous stillness. About 1 o'clock, apparently at a given signal, the enemy opened upon our front with the heaviest artillery fire I have ever known. Their guns were in position at an average distance of fourteen hundred yards from my line and ran in a semicircle from the town of Gettysburg to a point opposite Round Top Mountain. Their number is variously estimated from one hundred and fifteen to one hundred and fifty. The air was filled with projectiles, there being scarcely an instant but that several were seen bursting at once. No irregularity of ground afforded much protection, and the plain in rear of the line of battle was swept of everything movable. The infantry troops maintained their position with great steadiness, covering themselves as best they might by the temporary but trifling defenses they had erected, and the accidents of the ground. Scarcely a straggler was seen, but all awaited the cessation of the fierce cannonade, knowing well what it foreshadowed."

In the meanwhile the batteries along the Federal line worked their guns steadily and resolutely with scarcely any cover from the torrent of missiles poured upon them. Their conduct was the admiration of all who beheld them. As their cannoneers were reduced in numbers by those who fell, volunteers from the infantry took their places with alacrity.

General Hunt in his report says: "To oppose these [the batteries of the enemy] we could not, from our restricted position, bring more than eighty guns to reply effectively. Our fire was well withheld until the first burst was over, excepting from the extreme right and left of our position. It was then opened deliberately and with excellent effect. As soon as the nature of the enemy's attack was made clear, and I could form an opinion as to the number of his guns, I ordered from the park of the Artillery Reserve, all the batteries to move at a moment's notice, and then

proceeded along the line, to observe the effect of the cannonade, and to replace such batteries as should become disabled. About 2.30 P. M., finding our ammunition running low and that it was very unsafe to bring up loads of it, a number of limbers and caissons having been exploded, I directed that the fire should be gradually stopped, which was done, and the enemy soon slackened his also.

"About 3 P. M., soon after the enemy's fire had ceased, he formed a column of attack in the edge of the woods in front of the Second Corps. At this time four batteries from the Reserve reached this point, and were put in a position in front of the advancing enemy. I rode down to McGilvery's batteries, and directed them to take the enemy in flank as they approached. The enemy advanced magnificently. The batteries of the Second Corps on our right, having nearly exhausted their ammunition, except canister, were compelled to withhold their fire until the enemy, who approached in three lines, came within canister range. When our canister fire and musketry were opened upon them, it caused disorder, but still they advanced gallantly until they reached the stone wall behind which our troops lay. Here ensued a desperate conflict, the enemy succeeding in passing the wall and entering our lines, causing great destruction of life especially among the batteries. Infantry troops were, however, advanced from our right; the rear line of the enemy broke, and the others, who had fought with a gallantry that excited the admiration of our troops, found themselves cut off and compelled to surrender. As soon as their fate was evident, the enemy opened his batteries upon the masses of our troops at this point without regard to the presence of his own. Towards the close of the struggle three batteries near the point assaulted, which had lost heavily in men and horses, were withdrawn, and as soon as the affair was over their places filled with fresh ones. Soon the necessary measures had been taken to restore this portion of the line to an effective condition. It required but a few minutes, as the batteries, as fast as withdrawn from any point, were sent to the Artillery Reserve, replenished with ammunition, reorganized, returned to the rear of the line, and there awaited assignment."

The foregoing extracts, taken unitedly, embrace the main features of this celebrated charge; but Longstreet in his report, mentions some incidents, in addition, worthy of notice. After describing the preliminary cannonade, he says:—"I gave orders

for the batteries to refill their ammunition chests and to be prepared to follow up the advance of the infantry, and gave to General Pickett the order to advance to the assault. I found that our supply of ammunition was so short that the batteries could not reopen." The ammunition train had been moved further to the rear on account of Kilpatrick's threatening demonstrations. Longstreet, continuing, says:—"The order for this attack, which I could not favor under better auspices, would have been revoked had I felt that I had the privilege. The advance was made in very handsome style, all the troops keeping their lines accurately, and taking the fire of the batteries with great coolness and deliberation. About half way between our position and that of the enemy, a ravine partially sheltered our troops from the enemy's fire, where a short halt was made for rest. The advance was resumed after a moment's pause, all still in good order. The enemy's batteries soon opened upon our lines with canister, and the left seemed to stagger under it, but the advance was resumed, and with some degree of steadiness. Pickett's troops did not appear to be checked by the batteries, and only halted to deliver a fire when close under musket-range. Major-General Anderson's Division was ordered forward to support and assist the wavering columns of Pettigrew and Trimble. Pickett's troops, after delivering fire, advanced to the charge, and entered the enemy's lines, capturing some of his batteries. About the same moment, the troops that had before hesitated, broke their ranks and fell back in great disorder, many more falling under the enemy's fire retiring than while they were attacking. This gave the enemy time to throw his entire force upon Pickett, with a strong prospect of being able to break up his lines or destroy him before Anderson's Division could reach him, which would, in its turn, have greatly exposed Anderson. He was, therefore, ordered to halt. In a few moments the enemy, marching against both flanks and the front of Pickett's Division, overpowered it and drove it back, capturing about half of those of it who were not killed or wounded."

Pettigrew's command came under the fire of a good many of the guns on Cemetery Hill, in addition to those posted on the Second Corps' front, and it was this shattering fire of artillery that caused it to waver and break as described by Longstreet. It scarcely came within effective musket range before it fell back in disorder. Alex. Hays, who commanded the division of the Second Corps, opposite Pettigrew, says his troops fired but one

volley before the break occurred. Many of the enemy, appreciating rightly the danger of retiring through such a fire as they had just passed, threw down their arms, and making signs of surrender, rushed into the Federal lines as prisoners. Pettigrew and Pender were both desperately wounded, and nearly all their brigade and regimental commanders either killed or wounded; the change of commanders incident to this, at a crisis so appalling, was unfavorable to the steadiness of the troops. The two brigades of Pender's Division, marching directly behind Pettigrew's lines, did a little better; they got within easy musket range before breaking.

The distance from the edge of the woods from which the assaulting lines or columns emerged, to the Federal line on Cemetery Ridge, was about three-fourths of a mile, and with the exception of a few clumps of trees and bushes the entire intervening space was open, cultivated fields, but somewhat obstructed by stone and wooden fences. From Seminary Ridge the ground gently slopes for a few hundred yards, and then as gently rises again to an almost imperceptible ridge along which the Emmitsburg road runs; it then descends again, and again ascends in a longer slope to Cemetery Ridge. The assaulting line was in view during its entire march over this distance, and was consequently exposed all the while to the fire of the Federal batteries, and during the last half of the transit to the musketry also of a strong line of infantry, a large portion of which was sheltered, in some degree, behind stone fences, or slight breastworks made of rails. When still nearer, the assaulting line was exposed to canister fire from the artillery. Notwithstanding all this Pickett's portion of the line moved steadily forward; the gaps made in it by the artillery fire were filled up by closing in from the right flank. Although the movement was steadily forward, the troops seemed to shrink from a direct advance and constantly inclined to their left. The guns on Little Round Top enfiladed their lines, and for their number did fearful execution; while those on the right and left of the point aimed at by the enemy had a cross fire upon them. Their march across the fields was marked by the killed and wounded who fell in such numbers as greatly to reduce the strength of those still pressing forward.

Pickett, upon leaving the woods on Seminary Ridge, directed his course obliquely to the left, towards a small knoll on Cemetery Ridge occupied by Gibbon's Division of the Second Corps.

The left of Webb's and right of Hall's brigades of this division rested on this knoll, and these were the commands struck by that part of Pickett's command that succeeded in reaching the Federal line, and these too were the brigades most directly instrumental in repelling the blow.

The batteries of the Second Corps had the brunt of the assault. These were stationed between the infantry brigades, and from right to left as follows:—Lieutenant Woodruff's "I," 1st U. S. Artillery; Arnold's "A," Rhode Island; Lieutenant Cushing's "A," 4th U. S. Artillery; Brown's "B," Rhode Island; and Rorty's "B," New York. Of these battery commanders, Woodruff, Cushing and Rorty were killed in the engagement. Other officers of all these batteries were wounded, several of them mortally, while the loss in men was proportionately great. So much were these batteries cut up that, after the engagement, they were consolidated, making three out of the five. All of these batteries fought as batteries have seldom fought, and their officers acted heroically. Hall, commanding one of the brigades just mentioned, says:—"Lieutenant Cushing challenged the admiration of all who saw him. Three of his limbers were blown up, and changed with the caisson limbers under fire. Several wheels were shot off his guns and replaced, till at last, severely wounded himself, his officers all killed or wounded, and with but cannoneers enough to man a section*, he pushed his gun to the fence in front, and was killed while serving his last canister into the ranks of the advancing enemy." All other reports corroborate this of Cushing, and also of the high order of bravery exhibited by the other batteries, officers and enlisted men alike.

As before stated, Pickett directed his attack on Webb's and Hall's brigades, the two right brigades of Gibbon's Division, the front of which was covered by stone fences or such temporary breastworks as could be hastily constructed without tools, from rails, stones, and earth. This line reserved its fire until the enemy was within two hundred yards, when it was delivered with a withering effect, as was also canister from the batteries. But, notwithstand-

* Shortly after the close of the war a revision of tactics was made, wherein the nomenclature of a battery was made to correspond with that of a company of infantry. Among the changes thus introduced was that in which *two pieces*—called in the tactics of the war period, a *section*—were, and still are, called a *platoon*, while *one piece* is called a *section*, to correspond with a still smaller subdivision of an infantry company. This confuses history, and, following so closely after the war, was to say the least very injudicious.

ing, the enemy pressed ahead and were led over the stone wall by General Armistead, the commander of Pickett's leading brigade; and here ensued for near half an hour the fight that occupies such a prominent place in every account of the battle of Gettysburg. Armistead, who had so bravely led his men, was killed at this time.

While the brigades of Webb and Hall were engaged with the enemy in front, Harrow's brigade of the same division on the left of Hall, and Alex. Hays' Division on the right of Webb, were pouring in an oblique fire. Still further to the left, beyond Harrow, Stannard, commanding a brigade of the First Corps, swung around two of his regiments, thus securing a direct fire into the right flank of the enemy. The battle in and around this point now became a melée. The enemy concentrating at this one point, gained a few rods beyond the stone wall, but the farther he advanced the more desperate became his situation; troops from every direction closed in upon him, until further resistance became unavailing. As if by one impulse, the troops that had so gallantly crossed the stone wall, threw down their arms and submitted as prisoners to their equally brave adversaries.

The breach that Pickett made in the Federal line was of no value without the means of holding and enlarging it. More than half of the troops that originally started were those of Pettigrew and Pender; and these, as we have seen, fell back withered by the artillery fire; and without this support the force left to Pickett, after the losses sustained by him in crossing the plain, was entirely inadequate to effect a permanent break in Meade's line. The effective work done by the artillery in driving back Pettigrew and Pender was, therefore, the primary cause of the repulse of the entire attack. When Pettigrew and Pender began to waver, Longstreet sent Anderson's Division to brace them up; but when they broke to the rear he recalled Anderson, because, as he intimates in his report, the more he sent forward the more went to slaughter or captivity.

Pickett's Division consisted of the brigades of Garnett, Kemper, and Armistead. The first two were in the front line, while the latter constituted a second line in support. Garnett and Armistead were killed and Kemper wounded. Nearly all the field officers were struck down. Major Peyton, who succeeded to the command of Garnett's Brigade, describing the conflict in his report, says: "From the point where we first en-

countered the enemy's skirmishers, the brigade moved rapidly forward towards the stone fence, under a galling fire both of artillery and infantry, the artillery using canister and grape. We were now within about seventy-five paces of the wall, unsupported on the right and left, General Kemper being some fifty or sixty yards behind and to the right, and General Armistead coming up in our rear. * * * Our line, much shattered, still kept up the advance until within about twenty paces of the wall, when, for a moment, it recoiled under the terrific fire that poured into our ranks both from the batteries and from their sheltered infantry. At this moment General Kemper came up on the right and General Armistead in rear, when the three lines, joining in concert, rushed forward with unyielding determination and an apparent spirit of laudable rivalry to plant the Southern banner on the walls of the enemy. His strongest and last line was instantly gained; the Confederate battle-flag waved over his defenses, and the fighting over the wall became hand to hand, and of the most desperate character; but more than half having already fallen, our line was found too weak to rout the enemy. We hoped for support on the left (which had started simultaneously with ourselves), but hoped in vain. Yet a small remnant remained in desperate struggle, receiving a fire in front, on the right, and on the left, many even climbing over the wall, and fighting the enemy in his own trenches until entirely surrounded; and those who were not killed or wounded were captured, with the exception of about 300 who came off slowly, but greatly scattered, the identity of every regiment being entirely lost, and every regimental commander killed or wounded." Other Confederate reports, although not so circumstantial, corroborate the foregoing.

The Sixth Corps, and the remnant of the Third after the fight of the previous day, were coming up and near at hand when the enemy gave up the contest; and fresh batteries from the Reserve were also in readiness to take the place of those exhausted; so that, although, had Pickett been followed by his supports, it is not probable any permanent lodgment could have been effected within the Federal line upon Cemetery Ridge.

The death rate among the assailants was awful, and the wounded in proportion. About 5500 prisoners, including the wounded, were captured.

The discomfited enemy—or at least those who escaped death or capture—took refuge behind their line of batteries.

which showed such a formidable front together with the masses of infantry known to be in support of them, as to make it extremely hazardous to attempt to follow up the fugitives. It would in fact, have been a repetition of the enemy's experiment, but from the other side. Although the artillery ammunition of the enemy had run low at a critical moment of the battle, the batteries were now sufficiently replenished to have made a stout fight, and they were relied upon to repel any countercharge.

Nothing has yet been said of another assault attempted upon the Federal line some distance to the left of that part of it struck by Pickett. Although this was intended to have been a part of Pickett's charge, it was as it turned out an entirely distinct affair. The attempt referred to was that of two brigades of Hill's Corps under Cadmus Wilcox.

Wilcox says in his report that he received the order to advance to the support of Pickett some twenty or thirty minutes after the latter had started, and that as he advanced he was unable to see a man of those he was sent to support, although he marched partly over the same ground. He was, as it were, lost; and this arose from the fact that, although starting from nearly the same point, Pickett inclined to his left while Wilcox inclined to his right with a considerable angle between. When Wilcox arrived at the swell of ground along which runs the Emmitsburg road, he says:—"All of the enemy's terrible artillery that could bear on them was concentrated upon them from both flanks and directly in front, and more than on the evening previous; but on my men went down the slope until they came near the hill upon which were the enemy's batteries and intrenchments. Here they were exposed to a close and terrible fire of artillery. Two lines of the enemy's infantry were seen moving by the flank towards the rear of my left." The infantry just referred to by Wilcox were two regiments of Stannard's Brigade swinging around to take Wilcox in flank, as two others had but a few minutes before done to Pickett. The "terrible fire of artillery" mentioned by him came chiefly from a battalion of nine batteries and parts of batteries—the latter fragments of the battle of the previous day—of the Artillery Reserve under Lieutenant-Colonel McGilvery of the Maine artillery. Mention has already been made of the active service of this gallant officer in the battle of the previous day. He received a wound at Gettysburg from which he soon afterwards died. These

batteries, unlike those of the Second Corps, were united in one mass, and covered to a slight degree by a hastily constructed epaulment. Between the right of this large battery and those of the Second Corps, were four other batteries from the Reserve commanded by Captain Fitzhugh. All of these batteries, both of McGilvery and Fitzhugh, had had an oblique fire upon Pickett's lines as he advanced. Fitzhugh now had an oblique fire upon Wilcox, while McGilvery had a direct fire. It was directly towards his position that Wilcox was directing his course.

Notwithstanding the "terrible artillery fire" to which his troops were exposed, Wilcox managed to reach the bottom of the valley, or rather the low ground lying between the swell over which he had advanced and Cemetery Ridge upon which McGilvery's battery was located. This ground was marshy, rocky and somewhat covered by bushes, among which Wilcox's men screened themselves, and took shelter as much as possible behind the rocks. They, however, soon fell back in rout from this place, leaving many behind who, dreading the "terrible artillery fire" mentioned by Wilcox, gave themselves up in preference to returning over the ground by which they had come. In this way Stannard's command secured almost an entire regiment, colors and all. In this affair there was but little musketry fire; the repulse was accomplished by the artillery fire alone.

It is, however, almost to be regretted that Wilcox was not allowed to force his way, as did Pickett, into the Federal lines, where his entire command would almost inevitably have been captured or destroyed by the infantry.

Mention has already been made of the shortness of supply of artillery ammunition, arising from the fact that the corps had sent back to Westminster with the impedimenta a large part of that intended for their batteries, and of the great concern that this led to among those who were aware of it. When the enemy commenced his cannonade preliminary to his infantry advance, General Hunt, well knowing what was coming, gave strict instructions that as little firing as possible should be indulged in by the batteries; that they should husband their ammunition for the crisis certain to follow. This was strictly adhered to by McGilvery's batteries, with the exception of three of them, which opened fire by direction of Hancock; this firing was, however, soon discontinued by direction of Hunt, and all of the batteries had an ample supply with which to meet the crisis. The batteries on the Second Corps front

being more immediately under Hancock's control expended most of their ammunition, except canister, before Pickett commenced his advance, and therefore had none with which to break up his formations while crossing the fields and yet beyond musketry and canister range. These circumstances led to an angry controversy between Hancock, commanding a corps, and Hunt, chief of artillery, as to the extent of authority of each over artillery matters.

The repulse of Wilcox ended the battle of Gettysburg. Lee in his report says:—"The severe loss sustained by the army and the reduction of its ammunition, rendered another attempt to dislodge the enemy inadvisable, and it was therefore determined to withdraw." On the following morning, July 4th, Lee started his trains with such of the wounded as could bear transportation for the Potomac, taking the roads leading through the Cashtown and Fairfield passes, into the valley leading by Hagerstown to Williamsport. His troops retained their position until dark, when they, too, were put in motion by the same route, and marching day and night to avoid pursuit, soon reached the Potomac where his army strongly intrenched itself in a line covering the fords at Williamsport and Falling Waters. Meade harassed Lee's retreat with cavalry and on the 12th confronted him with his entire army, but finding him so strongly intrenched, desisted from immediate attack. During the night of the 13th Lee crossed the river with his entire command, partly by fording and partly by a temporary pontoon bridge, and this ended the Gettysburg campaign, the second one of invasion that Lee had undertaken.

Public opinion severely criticised Meade, as it had done McClellan at Antietam, for not annihilating the rebel army. These adverse criticisms were materially modified before the war ended.

The losses in this campaign, nearly all of which occurred on the field of Gettysburg, were:—Federals: 2834 killed, 13,709 wounded and 6643 missing. Total, 23,186. Confederates: 2665 killed, 12,599 wounded, and 7464 missing. Total 22,728.

Among the killed on the Confederate side were Generals Armistead, Barksdale, Garnett, Pender, Pettigrew and Semmes. On the Federal side, Generals Reynolds, Farnsworth, Weed and Zook.

In this battle the Federal artillery lost six pieces by capture. None were captured from the Confederates, although several pieces were picked up by the pursuing cavalry, and two were cap-

tured in an engagement near Falling Waters. The loss in horses, killed and disabled, and of material, was unusually heavy on both sides.

It will be seen from the foregoing that the artillery of Meade's army performed no insignificant part at the battle of Gettysburg, and was always at the right place at the right time; a fact clearly attributable to the new organization that had been given it. At each crisis of the battle, and there were several of them, it turned the trembling scale in favor of the Union cause.

Resting a few days after crossing the Potomac, Lee continued his march up the Shenandoah Valley, and crossing the Blue Ridge at the passes near Luray, continued down the south side of the Rappahannock to the neighborhood of Culpeper. Meade, crossing the Potomac at and below Harper's Ferry, marched his army parallel with that of his adversary, but on the eastern side of the Blue Ridge, and arrived near the Rappahannock at about the same time. Here he was directed to take up a threatening position, but not to advance against Lee.

Lee had a strong strategic position behind the Rappahannock, in which he securely intrenched his army, and this enabled him to detach Pickett's Division to the south side of the James River, threatening Suffolk, and to send Longstreet with Hood's and McLaws' divisions to assist Bragg in the impending battle of Chickamauga. This latter fact having become known to the War Department the Eleventh and Twelfth Corps were detached from the Army of the Potomac, and, under Hooker, hastened to the reinforcement of Rosecrans, but reached him too late for the battle of Chickamauga.

Lee's invasion of Pennsylvania emboldened the copperhead element of the North, and led to the draft riots of New York City, to suppress which required the detachment of a large force from the Army of the Potomac, and this was not returned to it until about the middle of October. In the meanwhile the corps of the Army of the Potomac had their depleted ranks replenished by the accession of many recruits from the enforcement of the draft, and from volunteering.

In the first part of October, Lee made an excursion towards Warrenton which resulted in a brisk affair at Bristoe Station between the Second Corps, temporarily under Warren, and Hill's Corps, in which the latter was worsted. On the 7th of November Meade advanced across the Rappahannock, and routing Lee from

his intrenchments at Rappahannock Station and other points, forced him to retire behind the Rapidan where he secured himself behind strong entrenchments at Mine Run. Meade, advancing, established his army about Brandy Station, and in these positions the two armies remained, confronting each other, until the opening of the memorable Wilderness-Petersburg campaign of the following spring; just before the opening of which the First and Third Corps of the Army of the Potomac were consolidated with the Second, Fifth and Sixth, commanded respectively by Hancock, Warren and Sedgwick. This consolidation gave to the army an efficiency it never before possessed, and gave to the artillery brigade of each corps about twelve batteries each. These brigades were each placed under a colonel with other field officers as assistants, together with a proper staff and complete supply departments. The artillery was at last upon its legs and from this on moved along without any hindrance, except occasional interference from those commanders not yet educated up to the progress of events and who still hankered to control it.

The next paper will treat of the organization and management of the artillery of the Army of the Cumberland, and how, through much tribulation, that, too, was finally led up to a similar organization and condition of efficiency.

PRACTICAL DRILL FOR INFANTRY.

By LIEUT. W. H. JOHNSTON, Jr., 16th U. S. Infantry.

THE army exists, not merely as a national police force for the preservation of peace and the protection of public property, but also as a nucleus about which to form army corps in time of war, and as a national school for the education of its officers, of its men and of the people in the art of war. This last and by far most important rôle would prove a dismal failure if limited to the education of those only who are in the service of the government. That such limitation is contrary to the theory of our government, however proper it may seem to the narrow-minded and egotistic, is apparent from the numerical weakness of our regular force, as well as from a consideration of the following circumstances.

Each year thousands of our enlisted men complete their terms of service and many of them return to civil life, better men physically, mentally and morally than when they entered the service. In future wars such men will probably be among the first to offer their services, and because of their training, or supposed training, they will demand and receive positions of consequence in volunteer commands. The principles and traditions imbibed during their service in the regular army will be their art of war, and will be by them instilled into others as the science itself.

At seventy-five colleges army officers are on duty as instructors, and at many other schools military instruction is had under retired army officers or citizens. In all of these it is fair to presume that the method and extent of instruction reflect the experience of the instructor in the regular army as far as the circumstances of those instructed will permit.

Officers are detailed annually to visit and inspect the encampments of State militia, and very naturally endeavor to lead the military ideas of national guardsmen into those channels which in the army are thought to lead most directly towards the perfection of military science.

Again, with the withdrawal of our troops from frontier stations and their concentration in large garrisons near cities, the

army is daily brought to the notice of many to whom it had before seemed only a myth, and whose only acquaintance with regular troops had been occasional glimpses of detachments of recruits en route to the West. Ideas of military training and of military methods of administration are gained through this association; and the unprofessional and credulous citizen cannot but believe that an organization whose aim and whose duty is the study of and preparation for war, must have solved the problem; and that whatever he observes at the nearest post, for the instruction and discipline of troops, must be that logical solution.

That the army thus serves as a school for thousands who rarely see a regular soldier, cannot be disputed.

But whether or not the course of study pursued and the method of instruction practised be the best preparation for possible wars of the future, may be very seriously doubted. Indeed, it may as well be frankly confessed that only a very small portion of our training would be of the slightest use in war.

The recent adoption of a new system of drill is a very important step towards improvement in our method of instruction; the orders directing practice marches, establishing service schools and post lyceums, requiring a more general attendance of officers and enlisted men at drill; and the proposed, and it is to be hoped probable, legislation for the improvement of the status and pay of non-commissioned officers, are other steps in the same direction.

But it is quite simple to prescribe a system of battle tactics, to order officers to study and men to drill. It will require more than orders and circulars to change the whole purpose and effort of our lives, from a supine custom of drilling for the ceremonies of peace and trusting to luck for war, to a practical preparation for a more serious ordeal than the annual visit of an inspector.

Aside from our own sluggishness, there are other reasons why we are not more practical in our training and more severe in our discipline. As a command is inspected, so will it be drilled; for it is but human nature to direct one's efforts towards meriting an official and favorable record of efficiency. If our efforts in the past have been too closely confined to the perfection of ceremonies and the acquisition of a clock-like accuracy in formations on the drill-ground, while little, if any, attention has been paid to battle-orders, it is because excellence in such peace manœuvres has been demanded by our inspectors, the superintendents

of instruction of this military educational system. While company books are scrutinized for missing signatures, and guard reports for mis-spelled names; while the fit of a soldier's clothing and the polish on his shoes receive greater attention than his physical condition to endure excessive fatigue in the same clothing; while the bronze of a man's rifle and the brilliancy of his belt are inspected, and the question of his ability to use either in action passed over in silence; while little is asked, and nothing learned concerning an officer's ability to lead troops elsewhere than upon a parade ground; is it strange that the soldier should lose himself in the policeman, his educational mission quite forgotten?

Prince Hohenlohe describes in one of his letters a method of inspection of an infantry battalion, from which it would seem possible for us to learn a useful lesson. After a review, to ascertain the setting up and discipline of the men, he permitted the battalion commander to execute whatever movements he chose of those in the German drill-book prescribing battle formations. This portion of the inspection lasted a half hour and enabled him to learn the degree of excellence attained by the battalion, in movements accurately detailed in the drill-book. Later came the real test of the battalion's efficiency. To quote the Prince:

"After a short rest * * * I set the battalion commander some simple problems, against an enemy marked out * * * by flags. In working these out the system of command and of direction had to be the same as it would have been in a real action. I allowed no other movements or words of command than those which are in the regulations. The captains were to receive no more definite instructions * * * than * * * might have been possible in war. The battalion commander had to remain in that position which he would have occupied in a real action. If a body of troops, who were already engaged so far that no counter-order could have got to them, did anything contrary to the original instructions, I allowed no counter-order to be given to them, but the battalion commander had to accept the fact and accommodate his ulterior dispositions to it. The description of fire (swarm volleys, the range, fire with two or three sights, the orders as to the number of cartridges to be fired, the pauses in the fire, independent fire or rapid fire) and the formations (whether in swarms, in line or in column, and what columns) were left to the junior officers concerned, who alone

were responsible for them, as also for orders to lie down, to run, etc. * * * As I set the problems, * * * I could * * * prevent the waste of too much time on any single movement, and if one threatened at any time to take too long, I could cut it short by introducing some other idea, such as a cavalry charge or a change from the offensive to the defensive, etc. Constant practice and a set routine enabled me * * * to make a battalion solve three or four problems in from three-quarters of an hour to an hour." * * *

Will it be seriously contended that the average battalion of our service could intelligently solve such problems in so short a time?

Yet our soldiers are equal to any in intelligence and capacity, and our officers would not acknowledge themselves inferior to those of the Imperial army.

The system is at fault, rather than the troops. We have wandered, in our military faith, from an orthodox preparation for war to the heresies of a mechanical manual, stiff lines and magnificent ceremonies.

It is not too late to return to the true faith. The false and delusive doctrines of would-be international peacemakers and the optimistic promises of diplomats, should no longer deceive men whose only reason for existence is possible war. War is a natural evil of human association.. As our commercial relations with other countries are enlarged, possible friction with other countries becomes less and less a theory, more and more a condition. Recognizing this, we should convince the people, and incidentally their representatives in Congress, of the necessity for a regular army as a national school of war, rather than as an armed force to threaten their liberty. We can appeal to their reason most logically, and solicit their support most efficaciously, by insisting upon the educational roll of the army, and by making our system of instruction less and less the display of blue coats and brass buttons on parade, more and more the physical training of men and the intellectual training of officers and non-commissioned officers for the battle-field.

This change can be effected without any further sanction from any headquarters; it does not involve voluminous reports, nor manipulated records; it rests wholly with ourselves.

In each garrison, in each department, throughout the service, line officers can model their duties upon a business-like prepara-

tion for war. They will do so, if they are in the service for any other or nobler purpose than their daily support.

The following exercises are suggested, not as a complete and perfect course of military training, but as useful additions to our present method of instruction.

PHYSICAL TRAINING.

Much greater attention should be given to the physical training of the soldier. Prince Hohenlohe states in another letter, "This systematic training of the infantry soldier, and the care given to each individual man, even in his musketry course and in his work in the open country * * * was one of the principal causes of our grand success in the last great war."

The setting up exercises should be had for ten minutes each morning, after reveille and before breakfast. There is no other hour at which the advantage to be derived would be as great, and being had then, no portion of the regular drill hour, or hours, need be devoted to this purely calisthenic exercise. The excellence of this drill is manifested in the development of muscles that had, before the soldier's enlistment, been used very little, if at all; since men, especially those of the lower classes, use but one set of muscles in their ordinary work as tradesmen.

But the physical training of the soldier should not be confined to this setting-up drill. An hour each morning could profitably be devoted to the bayonet exercise, fencing, boxing, wrestling, running, jumping, climbing fences, walls and houses, crossing ditches and swimming streams.

Finally, a course in graded gymnastic exercises under an experienced athlete in the gymnasium, walking track and swimming pool, with which it is hoped each permanent post may soon be equipped. Athletic contests between companies, such as base ball, foot ball, tugs of war and races, mounted and dismounted, should be encouraged, and all men permitted to hunt, fish or indulge in any out-door sport while off duty.

At least once each week this morning hour should be used in training the men (by companies) to march over rough country fully equipped for field service. Two gaits for a foot-soldier should be taught: one, to cover short distances in a few moments; the other for long forced marches. After the soldier has learned to control his breath, and to carry his gun, cartridge-belt, knapsack, canteen and intrenching-tool in the most comfortable

positions, he should be kept at the double time during most of the hour, with frequent rests at first and fewer later, and should be exercised in halting and lying down to fire while running thus loaded down. This method possesses advantages over a gymnasium in that it strains no particular muscles, and can be had for all the men, while a gymnasium is usually monopolized by those who need the training least.

TARGET PRACTICE.

Sufficient time is devoted to target practice under present orders to make any troops efficient riflemen. Yet the two most essential features of our practice figure more conspicuously upon annual returns than upon the range. I refer to volley firing and the estimation of distances. On paper we have an army of sharpshooters and marksmen, yet very few of our men could intelligently estimate distances greater than three hundred yards. When selected marksmen at annual competitions must pace the skirmish ranges and mark with sticks and stones the measured distances, what can be expected of the large number of men upon whose instructions no such lavish expenditure of time and ammunition has been permitted?

All our firing, to be instructive, should be had over ranges not known by the men and changing each day; practice should not be confined to fair weather, dull light and calm air, for the sake of excellent scores and the publication of a figure of merit. Volley firing should be had by each section and squad under its chief or leader and over unknown ranges from six hundred to fourteen hundred yards, to accustom the leaders to estimate distances, give commands and signals, and control the fire.

All the varieties of fire necessary in action, such as swarm volleys, individual fire, rapid fire, firing with counted cartridges, firing with two or more sights, and firing from cover while advancing by rushes, should be practised.

Owing to the adoption of the new drill regulations, exercise in the estimation of distances is more than ever necessary for non-commissioned officers, upon whose judgment much will depend in future actions.

FIRE DRILL.

Considering the value of property, public and private, at each post, the devotion of one hour each week to fire drill would not

be unreasonable. Besides the designation of special duty for each company, as, with the engine, hose-reel, ladders, buckets, axes, etc., it is necessary that all should be thoroughly familiar with the location of water plugs and ditches, and with the nature of fences, walls, roofs, etc., to be climbed. This familiarity with fire formations and possible fire localities would prevent undue excitement at fires and wanton destruction of property which might otherwise be saved. Fire drill should not be held at any stated hour, but when least expected.

OUT OF DOOR DRILL.

Except when rain or snow is falling heavily, there is no reason why drills should not be held out of doors throughout the year. Why should we mark time in progress for an hour in each day in a vain attempt to teach men in a crowded barrack, redolent with the odors of cabbage, onions and coffee, when even in the worst weather as much could be learned and more sickness avoided by drilling in the open air? More real good could be accomplished by marching the men over snow or mud in column of fours than by spending the time indoors wrestling with the position of the thumb at the balance or the proper cadence of the right hand salute.

STREET RIOT EXERCISES.

As many posts are near cities it is possible for their garrisons to practice the attack of mobs and the defense of buildings against mobs, the latter being represented by flags by day and by lanterns at night. The men should learn how to obtain shelter by the use of doorways, trees, posts, wagons and street-cars; how to advance as flankers through houses or over housetops; how to assault strong buildings or to surround and besiege them; how to patrol streets and railroad tracks, tunnels and bridges; and how to advance against mobs, or to form square to resist them.

RAILROAD MARCHES.

Some exercise should be had in placing troops upon trains and detraining them, loading and unloading stores, wagons, animals, etc., when platforms and stockyards are not available; all such exercises should be carried on with a view towards rapidity of loading and unloading, and of doing so always as if in the presence of an enemy.

PRACTICE MARCHES.

The present excellent custom of sending each garrison out once a year for practice in marching and camping, should be continued, but instead of walking fifteen miles a day along dusty country roads and camping at previously selected points conveniently near towns or railway stations, shorter marches should be made, the troops constantly manœuvring as if in an enemy's presence, and over ground adapted to the exercises to be had. All necessary supplies should be with the command, and not shipped daily by rail. Halts should be made wherever night or the hour appointed finds the column. If ground of good military features be passed, the command should camp there and demonstrate any tactical problem for which the natural features are adapted. In camp, exercise should be had in all the possible methods of field fortification and in building, or destroying, railway and telegraph lines, skeleton bridges over ravines and pontoon bridges, rafts and rope ferries over streams. Night attacks, defense at night and night marches should be practised, and always without previous announcement.

Outposts should be maintained, and exercise had in grand guards and the use of the parole and countersign.

Instruction in the soldier's duty in war, rather than his comfort and pleasure, should be the object of such marches. There is no reason why this rule should be at all inconsistent with the health of a command.

POST LYCEUMS FOR NON-COMMISSIONED OFFICERS.

No change in the drill regulations is more marked than the increased responsibility of the duties of non-commissioned officers. To prepare them for consequent additional requirements, a school should be established at each post for all the non-commissioned officers, in charge of an officer selected for his interest in their training and his qualification for the undertaking. The course of study should include the drill regulations, manual of guard duty, field fortifications, elementary tactics and the rudiments of military sketching.

This school, which need not interfere with recitations required in each company, should be held twice each week, except during the target season. At times, the class should be taken to suitable ground and taught the elementary principles of the terrain,

how to obtain cover, the adaptability of ground for offensive or defensive action, etc.

Uniformity of instruction, of interpretation of the regulations and of practice, would be among the good results to be expected of such a school. And all non-commissioned officers would be assisted by a comparison of the methods of instruction prevailing in different companies.

Their instruction, theoretical and practical, should include all that it is necessary for any subaltern to know in war, as their duties during war, whether in the regular or volunteer service, are likely to be those of a company officer.

TACTICAL PROBLEMS.

Once each week drills should extend throughout the morning or afternoon, according to the season.

A tactical problem, or more than one, having been announced a few days before, and books mentioned from which information concerning it could be obtained, all the troops should be sent to proper ground, either on the reservation or in the country adjacent, to demonstrate the problem or problems selected. For this purpose every officer should attend, and each company should have all its men possible with it. Warehouses could be closed, general prisoners locked in the guard-house under a non-commissioned officer, and one cook could watch each set of barracks. Thus, the guard, garrison prisoners, extra and daily duty men, and one cook and the room orderly from each company could attend the drill.

Should the garrison be large it might be divided into two forces, each with a battalion commander, adjutant, quartermaster, engineer, ordnance and signal officers, surgeon and detachment of the hospital corps. Each should have one or more machine guns, an ambulance, wagon train and field ammunition train, even though all be taken out quite empty. Troops should carry the full field equipment, including a spade and pick for each squad, if no entrenching tool be supplied.

It is presumed that, within a short march from the post, country can be reached, containing woods, hills, fences, streams or ravines, affording shelter favorable for military operations.

The two battalions should be sent to this theatre of operations, marching as if in an enemy's country, and placed a mile or more apart, as the origin of the first tactical problem. That should

then be demonstrated by such movements only as would be possible in an enemy's presence. Blank ammunition should be used freely. The drill regulations should be adhered to strictly in giving commands and in their execution. Leaders of small units, as squads, sections, platoons and companies, should be directed only in general terms as to the formation or direction in which to conduct their detachments, the selection of the best and safest methods being left to their ingenuity. Special exercises should be had in supplying ammunition, visual signaling, digging entrenchments, the care of wounded, defense and attack of artillery (represented by machine guns or wagons), formations against cavalry, and the defense and attack of villages and fortified places.

If the garrison be small, it should be sent out against an imaginary enemy, indicated by flags, or at night by torches or fires.

In either case each staff officer should submit a written report of his duties early the following morning, the engineer officer including a sketch of the country marched over, showing the disposition of the troops at various stages of the action. Rosters should be kept for service in all the various capacities likely to arise, and each lieutenant should serve in each capacity once each year.

These are but a few suggestions of change. They will be considered a reform by those approving; erratic and visionary theories by those satisfied with our present system.

It is not the purpose of this paper to reform the army, but to invite attention to the necessity for a change in its method of instruction.

While the drills recommended would add to the duties of both officers and men, it is not believed by any one, even if it be so claimed, that either officers or men are now fully occupied during as many hours each day as the average man, be his occupation a profession, a trade or a business.

Because it has been customary for years to drill one hour each day, is no reason why we should never drill longer. Because the indolent and negligent are content to meet the requirements of war when war becomes an imminent condition, is no reason why those of us without war experience should not be required to familiarize ourselves, through practical drill, with the proper conduct of troops in war.

Only a rapidly vanishing minority of our officers have had any experience in war. Our wars of the future, if much longer deferred, will be fought by men whose only training will have been purely theoretical, unless a radical change in our drill be directed.

Changes in the armament of troops will render future wars much fiercer and much shorter than was the late civil war. It will no longer be possible to devote months to the organization and training of such an engine of war as was the Army of the Potomac under McClellan, because we shall hereafter be confronted, very soon after an open rupture of friendly relations, by a foreign army fully prepared to act aggressively at once.

The Union and Confederate forces were equally unprepared for war; hence, procrastination rendered possible the crudest sort of consolidation and organization.

At this late date we are too apt to forget the reverses of '61 and '62 in our admiration of the men who by their patriotism, valor and perseverance, rendered possible the grand results which followed the war. Without detraction of those who contributed towards that successful termination, it may be asserted that the same results could have been obtained more promptly, had this Government, its army and its people been at all prepared for war.

The average line officer is ambitious, energetic, plodding, if not so brilliant as his brother of the staff. And orders for extra work, increased study or curtailed privileges are always cheerfully and promptly obeyed.

While other corps are pushing the development of an especial rôle and boasting of scientific attainments, we of the infantry should impress young officers joining us with the importance of especial training for efficiency in our corps. We should develop to the utmost the physique of both officers and men, and make our corps conspicuous as the fighting branch of the service, instead of mere food for powder.

Moreover, the discipline of enlisted men would be improved if more duty were required of them, and less solicitation shown for their imaginary wants and wrongs.

Let our inspectors demand of each infantry garrison all the additional exercises above named, and any more that are suggested as progress is made, and we shall soon forget that our duties were ever any lighter.

THE FRENCH GRAND MANŒUVRES OF 1891.

By CAPTAIN JAMES CHESTER, 3d U. S. Artillery.

"IN time of peace prepare for war" is a maxim which has little meaning to Americans. Indeed they practically ignore it. They find it convenient to do so, and they laugh at the idea that it may be dangerous. The fool's paradise is a happy enough home for them.

Nothing strikes the American tourist in Europe more forcibly than the universal preparation of the nations for war. He sees soldiers everywhere. Like vast colonies of ants, they are constantly marching, manœuvring, billeting and bivouacking, without regard to health, comfort or economy, and he concludes that war in the spring is a lamentable certainty. Men tell him that what he sees are merely the autumn manœuvres; that they occur every year, and that they are no more an indication of war than barrack-yard drill is. But he knows better. It would be bad policy, perhaps, for them to admit it, but there will be war in the spring. And he writes home accordingly.

News of that description should be received with caution. However honest the writer may be, he is apt to be mistaken. The value of his statements depends upon his opportunities to see and his ability to judge. And even when many witnesses so testify, and there seems to be a consensus of opinion pointing in a certain direction, certainty should not be immediately assumed. The opportunities and capabilities of all the authors should be strictly inquired into, and their evidence carefully sifted, sorted and compared, before their statements are accepted. In professional matters the layman's opinion must yield to that of the professional witness, opportunities of observation being equal; but not without scrutiny. All men have hobbies and professional men are not without bias on questions affecting their own specialties. Honesty is not inconsistent with opposite views; but statements of fact ought to be reconcilable.

These reflections have been induced by reading two articles on the same subject: one entitled "The French Armies," by the Right Honorable Sir Charles W. Dilke, Bart., which appeared in

the *Fortnightly Review* for November, 1891, and the other entitled "Sir Charles Dilke and the French Army," by Captain F. N. Maude of the Royal Engineers, which appeared in the *United Service Magazine* of London, for January, 1892. These writers, although they looked at the same troops during the same manœuvres, have reached such opposite conclusions that their statements call for the most careful sifting.

Sir Charles starts off with the unqualified declaration that Germany has this year lost that uncontested supremacy in Europe which she has enjoyed for twenty years. Fortunately he has told us in the article above referred to what he saw, and we are able to weigh his reasons and compare his statements with those of other competent observers.

He tells us that he was a privileged spectator of the French Grand Manœuvres, in which four complete corps, two independent cavalry divisions, and some "dog-fish," as the French seem to call marine infantry and artillery, manœuvred under the command of General Saussier.

We have his description of a night march, always an interesting and exceedingly difficult undertaking; especially when it is the prelude to a night attack and forcible passage of a river; but how it was done he fails to tells us. Indeed there seems to have been some misgivings about it in the mind of the general himself, for the foreign officers were not invited to witness it. But there were no restrictions on Sir Charles. He saw it, and certifies that it was a success. He says furthermore, that the success of the night march was achieved partly by the use of extraordinarily brilliant torches at the head of every regiment. Think of trying to steal a march on an enemy with a torchlight procession! It would perhaps be expecting too much from a non-professional spectator of such a manœuvre, to hope for answers in his account of it to such questions as: Where and how were the enemy posted? What were the tactical formations of the assailants? When and how were the bridges laid? How was the crossing covered?

There is nothing very instructive in merely crossing a river, even if it be done by night and by torchlight, if it is not opposed. If it is opposed, then how the opposition was overcome is the all important thing. But Sir Charles says nothing on that subject, and we regret it all the more, as he was the only foreign spectator of the manœuvre.

The marching powers of the French infantry receive appropriate commendation. Some of them, he says, covered 37 miles in a single day in heavy marching order. The 1st Independent Cavalry Division marched one day fifty miles.

He compares French and English marching, and thinks, because he saw some English troops playing ball after marching from 6 A. M. to 2 P. M. that their officers ought to have got much more marching out of them. But much depends on what is to follow the marching. If they have to fight and manœuvre at the end of it, energy will be required, and they should not be exhausted. Men marching to meet the enemy should be able to play ball at the end of every march, except on special occasions when forced marches must be made. But no commander who has any knowledge of that exquisite piece of mechanism—the human body, and that mysterious occupant and operator of it—the human soul, will care to overtax its energy by forced marches on the eve of a battle.

But Sir Charles does not continue laudatory throughout. He saw some sore spots.

The manœuvres were, according to Sir Charles himself, "overprepared," and although he says the army was perfectly handled, he also says that the outpost system was defective, and that, except for one day, sentries were barely set at all. He saw a general ride with his whole staff into the lines of his opponents ; and could not find any attempt at exploration, or any precautions against an enemy who was close to Brienne on the other side of a narrow and easily fordable stream.

Sir Charles seems to have been very much struck with the fact that not a single officer was found—certainly not upon the headquarter staff—who was not able to explain at any time the nature of the movements. But that was not so surprising, seeing that they were all prepared and printed months before perhaps. No doubt every officer had a programme in his pocket.

The Signal detachment does not seem to have been much used. There was no need for it as everybody had their orders before the manœuvres began. They had heliographs, telegraphs, telephones and pigeons, and perhaps flags and torches, although we are told the latter were never used. Indeed the whole outfit seems to have been ornamental. The telephones were not successful ; the heliograph was not so well managed as in India ; the telegraph wires were frequently cut by the wheels of artillery

carriages, and the pigeons were looked upon as poultry on the hoof, which might be drawn upon in an emergency.

The infantry is highly, and no doubt deservedly, praised for marching, the Rifles on several occasions making six miles an hour. But when we read that guard duty and all the minor operations of war,—outposts, scouts and reconnoissances,—were omitted in order to give all the men their night's rest, and thus enable regiments to march without leaving men behind, we feel inclined to discount the commendation. Soldiers should never be permitted to think for a moment that any kind of campaigning can be done without guards, patrols and outposts. These duties are the most sacred that a soldier can be called upon to perform, and their proper performance is of more importance to an army than even a six mile gait.

The picture which a careful perusal of this paper leaves upon one's mind is something like this: The Grand Manœuvres were participated in by four and a half corps of excellent troops. The marching was very good, and the pre-arranged manœuvres were executed according to programme, without much confusion. The crossing of the Aube was successfully accomplished after a stealthy night march, in which a number of Lamarc torches were carried at the head of each regiment; but whether they surprised the enemy, or scared him off with the torches, or even whether or not there was any enemy there, seems doubtful. No attempt at establishing touch with the enemy, or even reconnoitring his position when he was known to be in the vicinity, was ever made, because the troops were too tired. Neither outpost nor guard duty was attempted for the same reason, and because it was necessary to keep the men and horses in good condition for marching. In the attack the troops advanced leisurely and without bothering about cover. The artillery at short ranges pretended to fire over the heads of their own infantry until they were almost in contact with the enemy; and the cavalry—well, they rested so as to be able for the march next day. Sometimes a general strayed into the enemy's lines and created consternation there, because there were no instructions covering the point, and the hostile troops were at a loss to decide whether they should shoot him or salute him. And all this was conducted strictly under the conditions of actual war.

Generally speaking, the commanders of these troops, especially those in the higher grades, were all that could be desired.

In short, the French generals showed during the manœuvres that they can handle enormous masses, without confusion, under a cut and dried programme, and France feels that she has "recovered her army," which has been lost since 1871.

Let us now call the professional witness.

Captain Maude of the Royal Engineers was also a spectator; not specially privileged perhaps, but officially recognized as an invited guest of the nation. He was present at the sham fight at Vandeuvre, where Sir Charles saw some anomalies and complacently remarked that they would all be corrected by the bullets and shells of the enemy.

This battle seems to have been the grand culmination of the manœuvres, the 5th and 6th Corps contending against the 7th and 8th. The attacking army was advancing with the expectation of finding and fighting the enemy; but they had no cavalry advance guard, "only a few scouts," Captain Maude says, who either did not know, or knowing failed to do their duty. In consequence of which one whole division formed up in two masses within 1500 yards of the enemy without knowing that he was there—that is they did nothing that indicated that they were aware of his presence.

On the right front of these masses, and perhaps 1500 yards away, the enemy occupied an intrenched outpost, and if the masses advanced to their proper front, this outpost would be outside their right flank. This must have been apparent to the commander, as the outpost and its intrenchments were in plain view. But no attention was paid to it. The two masses put themselves in formation for attack towards their proper front. The formation was three lines of company columns at deploying intervals, and covered by skirmishers. In this formation they advanced until their right flank was within 800 yards of the intrenched post already mentioned and there lay down.

Captain Maude, who was with the fighting line, could see the enemy distinctly preparing his position for defense; but no notice was taken of his presence by the assailants. This is difficult to account for. Perhaps the attack of that outpost was no part of the work of this division, according to the programme. It may have been outside its prescribed zone of operations, and it was therefore ignored as if it had been non existent. But if it had been actual war instead of peace manœuvres, that outpost would have asserted its presence in an unmistakeable manner.

After a short rest the advance to the attack was resumed. The platoons of the first line broke into sections and assumed the quin-cunx order—that is, the second sections covered the intervals between platoons. The other lines remained in company column. In this formation they swept past the intrenched post, leaving it about 300 yards outside their right flank, and without paying the slightest attention to it.

And here some description of the position to be assaulted becomes necessary. Of course, Captain Maude saw only a fraction of the whole line of battle, and his observations were confined to that fraction. That fraction was perhaps 3000 yards long. The main line of battle occupied a ridge about 2000 yards long, which may be compared to the curtain of a work; and two strongly intrenched outposts, one in front of the right and the other in front of the left, stood out like bastions 500 yards in front of the curtain. We adopt the nomenclature of a regular work for convenience of reference.

The left bastion, or outpost, of this section of the general line, is the intrenched position which the attacking force ignored in such an unaccountable manner, leaving it 300 yards outside its right flank. It was occupied by infantry alone.

The right bastion, 500 yards in front of the right of the curtain, was more elaborately intrenched than the left one, and was occupied by infantry in the trenches, and five batteries of artillery on the high ground in the centre of the position. The artillery could fire over the intrenchments.

Although the left bastion contained no artillery, there were four batteries posted in rear of the left of the curtain on ground sufficiently high to enable them to fire over the intrenchments and to cross their fire with the five batteries in the right bastion on every foot of ground in front of the curtain within range.

The curtain was occupied by 4000 infantry.

The attack of the right brigade of the division which we last saw sweeping past our left bastion and utterly ignoring its existence, was directed squarely against what we have called the curtain. When it came abreast of the two bastions it was subjected to a deadly musketry fire from the curtain and the bastions, and a cross fire from the 9 batteries of artillery. The duty of returning this fire checked the progress of the first line, and the others crowded up upon it forming what was practically a mass formation at about 40 yards distance. This mass was the target for 9 bat-

teries of artillery at about 1200 yards, and 4000 rifles at 400 yards for about 15 minutes; but the men showed perfect "indifference to what was going on around them," and some of them even left the ranks to look at the show.

We are not told what the decision of the umpire was upon the situation here presented, and indeed no decision may have been made. The attack was continued in spite of the overwhelming fire, and Captain Maude transferred himself to the left brigade of the attacking division.

The attack of this brigade was directed against what we have called the right bastion. The formation for attack was similar to that adopted by the right brigade, and the advance seems to have been simultaneous. There seems to have been no preparation for the attack by artillery although 8 batteries were available for that purpose. That is, we assume there was no such preparation, partly because Captain Maude does not mention it but principally because if there had been, the batteries in the right bastion would have been enfiladed and could not have maintained their position, which would have been a great relief to the right brigade.

About this stage of the attack Captain Maude reached what we have called the right bastion. The 5 batteries were still there; but either because they thought they had paralyzed the right attack, or because they realized the danger of their own position, or more probably because it was in the programme, they now limbered up and again came into battery facing obliquely to the right about 500 yards in rear of their former position. It is difficult to account for this movement, unless we assume that the assailant's artillery had opened an enfilade fire on them, which it ought to have done before the infantry attack began. But even that does not justify the movement. A whole brigade was advancing on the bastion which they abandoned. They could fire upon that brigade from their old position, but from their new it was completely masked. And so their new line fronted obliquely to the right, and their fire was directed upon troops not immediately threatening their position, and the attacking brigade advancing upon the right bastion was opposed by musketry alone.

The intrenchments were carried in a leisurely manner, and the umpires directed the defenders to retire on a village some 500 yards to the rear, that is, nearly on the line of the curtain.

This village was now attacked, the assailants advancing in a

succession of lines scarcely 100 yards apart, and the defender's artillery abandoned its new position and retired. No attempt was made to capture the guns although such an undertaking was perfectly practicable.

Having got rid of the artillery and also possession of the village, the attacking brigade now wheeled to the right on the village as a pivot, with the intention, perhaps, of taking the curtain in flank. While this movement was in progress a "large body of marines" suddenly appeared on the marching flank of the assailants, and poured volley after volley into it at 300 yards distance. But little attention was paid to this formidable attack. A few companies faced them and returned their fire, but "The Charge" sounded, and they all scampered off, leaving the "large body of marines" directly in their rear. The assaulting line surged forward, twenty or thirty men deep, in absolute disorder, and in spite of the fact that they were completely enveloped in a semicircle of fire, and had the "large body of marines" in their rear, they seem to have been successful.

But French troops will not submit to defeat even in a sham battle. It was necessary that both sides should be victorious, so it was decided that although the losing side had lost the position, they had saved their artillery, which was the object of that flank attack by the "large body of marines." It does not appear that the artillery was in very serious danger; but that could be assumed. The battle was a sham battle, and why should it not have sham dangers. Were they not prescribed in the programme? We cannot deny it. But if they were, the programme was exceedingly faulty. That "large body. of marines" were sadly exposed while they were pouring volley after volley into the marching flank of the assailants. Their own right flank was exposed to a possible cavalry charge from a ravine within 150 yards of them, where a cavalry column could have been concealed, and where such a column should have been if the natural features of the position had been properly utilized. But then, there was nothing of that kind in the programme.

Our witness now transferred himself to the side of the defense, and found two brigades of the 6th Corps in line, with a rather sharp salient towards the attack, in such a position that both branches of the line were open to artillery enfilade from the position now held by the attacking force. "But no one seemed to think it worth while to move." There seemed to be no energy,

no life in the line. And there were many stragglers, or skulkers as they would be called in real war, lying around. "One little copse by the road seemed full of them," and more significant still "fully 20 per cent. of the supports were lying on their backs fast asleep." And all that while the attack above described was in progress. And thus we get a glimpse of what over-marching means.

The artillery of the defense had now formed a new line about 3000 yards in rear of its former position. The assailants had also brought some guns to the front, and had taken up a position which enfiladed the new artillery line. To meet this, two batteries on the left changed front in that direction and returned the fire. But the remainder of the line stood fast. The unrealities of sham battles could not be better illustrated than it was by these twelve batteries not only indifferent to, but actually unconscious of, the heavy enfilade fire to which they were subjected. Some of the drivers had dismounted and were "sound asleep in the shadow cast by their horses." No doubt the artillery commanders knew that according to programme their real assailants were to come from another direction. Hence their contempt for the enfilade. At any rate, in a very short time, a whole brigade of infantry advanced from the south against the right of the artillery line; the infantry supports retired and there is no telling what might have happened had not "Cease Firing" sounded and put an end to the action.

Such is the picture presented by Captain Maude. He does not attempt to describe the movements of the whole army, but only that portion of it which he saw. He had a good eye for ground, as might be expected in an engineer officer, and was able not only to comprehend the scope of the manœuvres, but to take in many of the details at the same time. We do not care to cite his opinions. We called him only to tell us what he saw. We have the substance of it, and also the statements of Sir Charles Dilke before us.

From a careful study of both papers we think the following facts are established:

1. The French infantry are excellent marchers, but they were unmercifully over-marched during the manœuvres.

2. The cavalry were over-marched, and so exhausted as to be unable to perform their legitimate functions.

3. The artillery seems to have come into action in much bet-

ter condition than either of the other arms; but it appears to have been used only to make a noise on the battle-field. There was no artillery prelude to the infantry battle. The attack was never prepared by artillery fire. And no one,—not the umpires nor even artillery officers,—seems to have interpreted the meaning of the adversary's artillery fire aright.

4. Guards, outposts, reconnaissances and all the minor operations of war were entirely neglected.

5. The infantry and cavalry reached the battle-field in such an exhausted condition as to be unfit either for a spirited attack or a vigorous defense.

6. The manœuvres were over-prepared.

7. The true functions of command were contracted into the narrow limits required for the execution of a cut and dried programme.

8. Sham attacks and assaults give men false ideas of actual conflict, and prepare them for demoralization the first time they encounter the terrible reality.

9. If commanders are to be tested they should be untrammeled.

10. There is nothing to be learned from a sham battle. The manœuvres should end when the armies are brought to the scratch.

The teaching power of peace manœuvres from which all the essential minor operations of war are eliminated can neither be great nor good. Such manœuvres are merely displays, and their effect upon officers and men is confined to that consciousness of power which is sometimes called the sympathy of numbers. Similar results can be obtained by a review. The simulated operations of war practised in peace manœuvres may be made easy to the men, by eliminating those arduous and important duties which tax the endurance and try the fortitude and vigilance of individuals, and the display remain the same; but they will teach false ideas of war. To say that the bullets of the enemy will soon teach the soldier to hunt cover, and that considerations of his own safety will make him vigilant, is merely begging the question. The school of experience is an excellent but expensive institution. The sacredness of guard duty cannot be taught in a day any more than the importance of thorough and conscientious reconnaissance work. The soldier must serve an apprenticeship as a scout and as a sentinel before he can even

approximate efficiency, and his training and proficiency in all his duties should be thoroughly tested during the grand manœuvres. If he could be captured while on post, by an enterprising enemy, or should stumble blindly into a superior hostile force on reconnaissance and thus become, not only the subject of official censure, but the laughing stock of his regiment, he would have learned a lesson which he never would forget, and his regiment would learn it with him. Instead of dispensing with essential duties during peace manœuvres they should be insisted on with relentless rigor, not only as regards the soldiers, but also the officers of every grade.

The over-marching of men should be made a military crime. To bring troops on the battle-field in an exhausted condition is simply to sacrifice them, and at the same time to endanger the cause for which they contend. Forced marches may be necessary at times when a threatened post has to be reinforced, or an important position occupied; but to indulge in them as the prelude to an attack upon an enemy's position is to handicap the army and not only to risk but to deserve defeat.

Commanders should not be fettered with a programme prescribing details. The broadest outline only should be prescribed. It is humiliating to a commander to be deprived of all initiative, and compelled to follow a prescribed line of action whatever circumstances may transpire. No matter if there be an intrenched post within 300 yards of his right flank, or a large body of marines pouring volley after volley into his left, he must pass them by unheeded, because they are not in the programme. The unreality, absurdity and downright idiocy of such performances can arouse nothing but disgust in the mind of every one capable of comprehending the situation.

Sham battles may be amusing to spectators, but they are hardly edifying to professional men. Peace manœuvres, therefore, should end when the formations for attack are completed—certainly when the infantry are about to enter the deadly zone. Up to that point they may be made instructive. Beyond it they are misleading.

Grand manœuvres should be a test of proficiency for every officer and man in the army. Commanders-in-chief should be provided with the theme—a short statement of work to be done or prevented—but they should be otherwise untrammeled. They should solve their problems in their own way and on the spur of

the moment. Let them find each other out; obtain and maintain touch with one another; develop each other's strength; select positions and carry their preparations for attack and defense up to the moment that the assailant is ready to enter the deadly zone. Then, while their troops stand in that position, let the Grand Director, in the hearing of all the general officers, criticise and judge.

Finally, everything should be done under the simulated conditions of actual war. "Lame Ducks" should be convicted of their lameness, and if they are incurable, deposed. The Staff Departments should perform their functions under war conditions. The army must be fed, for instance, wherever it is, even if the commissariat has only a general idea of where it is likely to be. Orders should be written and transmitted, and reports should be made and forwarded as in actual war. In short the grand manœuvres should be tactically and strategically, a real campaign.

We hardly think that the grand manœuvres of 1891 are the complete demonstration of French superiority in military matters which Sir Charles Dilke conceived them to be.

PRACTICAL WORKINGS OF RIFLE PRACTICE AGAINST AN ENEMY.*

By GEN. GEO. W. WINGATE.

IF twenty-five years ago some traveller returning, like Stanley, from an expedition into the unexplored recesses of Africa, had announced that he had discovered a rich, warlike, and ingenious people, maintaining at a large expense an army commanded by officers carefully trained in a special school, and which army was provided with costly weapons, extremely destructive in the hands of those who knew how to use them properly, but that these specially trained officers devoted their energies to teaching their soldiers how to go through certain curious motions with their weapons in a prescribed cadence, and utterly neglected to teach them how to use them for purposes of warfare, the result being that these weapons were of little more practical value, in the hands of the men who carried them, than so many broomsticks,—such a traveller's tale would have been greeted with derision. Yet that was precisely the state of affairs in the United States at that date, although a great war had just closed.

One of my earliest recollections is of going with my father to the scene of the "Astor Place Riots," where New York showed its provincialism by getting up a riot to prevent an English actor from appearing upon the stage, because he was said not to have been civil to a popular American actor, when the latter was in England. I looked on the one hand at the barricaded windows of the Opera House with every pane in flinders, and at the foot deep (or more) of cobble stones in the area which had been thrown by the rioters at the soldiers. On the other hand I gazed at the wall of the Langdon House on the opposite corner and saw its yellow surface spotted with bullets up to above the second story, and my mind then received an indelible impression that there was something wrong in the instruction of troops, who under the fire of those cobble stones, not only did not shoot the mob that threw them, but found difficulty in hitting a three story house across the street.

* Read by Gen'l Geo. W. Wingate before the United Service Club in New York, in December, 1891.

This experience was intensified by my personal experience in the late unpleasantness. Once I remember seeing a cow emerge from some bushes and run in front of a target at which my company was firing a volley,—one of the very few occasions, by-the-bye, when anything of the kind was ever practised (for the reason I suppose, that the officers knew no more than the men did). I looked to see the cow converted into a colander, but while dust flew to the right and the left of her, she stuck up her tail and departed with great speed and in a perfectly sound condition, probably because she happened to be just in front of the target.

These experiences resulted in my undertaking to see if there was not some way in which it was possible to teach a soldier to do something with his rifle that would be more damaging to his enemy than precision in manual of arms. This led naturally to the formation of the National Rifle Association, the establishment of Creedmoor, and the introduction of rifle practice as a part of the instruction of the National Guard—and the rest followed.

And here (although it is a digression) I wish to say a word of grateful recognition of the services in this respect of an old friend, now gone to his reward,—Hon. David W. Judd,—without whose untiring labors in the Legislature, Creedmoor never would have had an existence, and whose memory I trust will be kept alive in the "Judd Match" as long as Creedmoor exists.

It would naturally appear as if any attempt to introduce rifle-shooting as a practical matter would be at once eagerly taken advantage of. But few can appreciate how slow this innovation upon established tradition was in getting into use, and the hard, uphill fight that was required to make it a success. It was welcomed by the young and enterprising soldiers, but many of the older officers who "knew it all," received it with that chilling conservatism and stolid opposition, with which old soldiers have welcomed every military improvement. I remember a very distinguished captain of the Seventh, who publicly protested against having to drill his men "in this system of Wingate's" on the ground "that it consumed time which could be more profitably devoted to the 'Manual of Arms.'" Still, as we had common sense, the newspapers, and, in this State, General Headquarters on our side, the National Guard was unusually prompt in taking hold of the matter.

The Regular Army, however, as is its custom, was much slower in getting around. The engineers were the first,—Willet's

Point was close to Creedmoor, and their men were at first employed there as markers. They entered a team in the Army and Navy Match at the very first fall meeting of the National Rifle Association in 1873, which stood fifth, but in this their score was only 108 out of 336, six of their team making from 2 to 9 points in the seven shots at 500 yards. The next year they made 154 and only had three men below 11, and in 1875 they made 255.

In 1873, the third year after Creedmoor was opened, a team from the Regular Army made its first appearance. They were a splendid detachment, models of soldiers, but to use a little slang "they couldn't shoot a little bit." I remember well how Judge Gildersleeve and myself (with the patriotic idea that the Regular Army should not be made so ridiculous as to prevent their coming again) endeavored to teach this team how to take a position in firing prone, and particularly to give them a vague idea of the use to which the rear-sight of their rifle was intended to be put, and the elevation required at 500 yards, two things concerning which their minds were free from either prejudice or information. Under this distinguished guidance, only six of the team made under 11 (the possible having been increased by the change in the marking from 336 to 420).

The fact that the leading scores of the National Guard teams were: 2d Connecticut, 306; 23d New York, 304; 48th New York, 302; 12th New York, 298; 22d New York, 292, and 2d Connecticut, 275, while the regulars made but 135,—is a striking commentary on the difference between the progress that had been made in three years in the shooting of the two organizations. From that day, however, the army took hold of the matter with vigor.

I cannot say that I was pleased to have my Manual of Rifle Practice calmly appropriated (including mis-prints) by Colonel Laidley, nor after I had had his work enjoined by the U. S. Courts, as a violation of my copyright, to be told by the War Department that in the new edition he had issued he "had given credit to all the authors from whom he had received assistance, and in the list the name of General Wingate did not appear."

But it did not make any difference whether I was pleased or not, and it is an old story now and of no importance to any one.

While slow in beginning, yet the army has proceeded thoroughly in the direction in which it has gone, and I am inclined to think is now a very superior shooting organization, far beyond

the National Guard, and I think is, *at targets*, ahead of foreign armies. At the same time it does seem a little singular to read in the various official and semi-official papers published within the last ten years upon the subject of rifle practice in the army, a calm assumption that it has done it "all of itself," single handed and alone.

But the question now is, are we proceeding in the right direction to develop the kind of shooting required in war, which is the only kind that is of any value.

Of course until a soldier can hit a mark at known distances with accuracy there is little use of his firing in any other way, and until he can do this, practice at fixed targets and known distances is a necessity. But it seems to me that the regulation shooting is becoming too formal and too much based upon the smoothly mown field of the rifle range.

With the National Guard of the States, and particularly of the great cities, where men give their time from their business and where a visit to a range takes substantially a day, it is almost impossible to do more with the men than to give them practice at known distances, and in these to teach them to shoot up to 500 yards. At the same time there is no reason why a man who has demonstrated his skill at short ranges, should not be required to devote what time he can spare to more difficult work. In New York State it appears to me that improvement in the last ten years in the method of instruction has been less than it ought to be, and that we are getting into a rut. There are now more armory rifle galleries and the men in that way learn a great deal, but this is done with the rear sights flat, and when the men come to fire with the sights raised they find themselves compelled to assume a position which is new and strange to them. Hence they do poor work. This would be cured by practice in aiming and position drill. This is also valuable in developing the muscles used in aiming, and particularly in training for volley firing, of which I am a strong advocate. It is therefore with regret that I learn that aiming drill has been practically dropped among the State National Guard. It is the foundation of the system, and even such thoroughly seasoned shots as Sir Henry Halford's volunteer team when in this country devoted half an hour a day to it. It is the only way in which you can train men so they will feel easy and be steady in aiming kneeling or prone, with their sights elevated to 500 yards.

The new drill system makes an important innovation in requiring the object to be aimed at and the distance to be announced at each command "ready," and the men to adjust their sights accordingly. This will give soldiers practice in quickly adjusting the sights of their rifles, which is much needed. But as in the National Guard armories there is nothing to aim at, our military authorities should provide for the painting upon their present blank walls of some rough sketches like a scene in a theatre. Scattered skirmishers behind cover in the foreground, with the heads just showing. Reserves behind them, a regiment in line in the distance and a battery still further, all drawn as these objects would look in perspective if seen at distances from 200 to 800 yards. These would cost but little and would add to the looks of the room.

With them to aim at, the men would have practice which would be of value and would get the idea out of their heads that there is anything in war like a black bull's-eye upon a white ground.

In many of the States and particularly in the West, the National Guard are practised in skirmishing and do good work. But what in this State is called skirmishing, I cannot but regard as a farce.

To have men walk once or twice a year over a range and fire one shot at each halt, consumes time and ammunition without teaching them anything. This is particularly the case when there is no selection of the skirmishers, as to previous skill.

The plan of Col. Chase (the Massachusetts General Inspector of Rifle Practice) of having those who qualify as marksmen trained to estimate distances, will probably prove a wise substitute for actual firing in those cases where the latter cannot be had.

Another mistake made at Creedmoor is in not permitting soldiers who are ordered there to shoot enough. If a man does not make the prescribed score at the second attempt he is not permitted to shoot again, whether the time and targets will allow or not. This does much to hinder improvement and to annoy the men. They give their day to learn to shoot and the more practice they get the better. This is particularly the case in firing for the sharp-shooters badge.

But if the National Guard cannot go any further than they have done, it is otherwise with the Army.

They have a much higher standard in target firing and come

up to it wonderfully. By General Sheridan's direction they have introduced and developed skirmishing and make remarkable scores at it.

But it seems to me their practice does not sufficiently keep in view the exigencies of war.

First and foremost, "fire discipline" is recognized by all military writers as the absolutely essential thing in all warfare. With the introduction of magazine guns it is going to become even more important, if that were possible.

But a few minutes is required for excited men to expend all the ammunition they can carry and when this is done they become demoralized, as was the case with the French in some of the great battles of the Franco-Prussian War. This waste of ammunition can only be overcome by incessant drill, which will prevent men from firing except under orders, and will train the officers as to how and when those orders should be given. The new system of drill provides for the giving of orders limiting the number of shots, but I know of nothing that has actually been done in the drilling of our troops or in their rifle firing to grind this matter into the officers and men, as is indispensable to make it work practically in warfare.

Our system of shooting as heretofore practised appears to be prepared with the sole idea of making high scores at a target upon a well-kept, smoothly mown rifle range. The use of skirmishing targets is a wise departure over the previous idea that the soldier was to be trained only to shoot at a black bull's-eye upon a white ground. But beyond this how far have we gone? I fail to see any benefit in the elliptical instead of the circular divisions upon a target. It seems to me that it is more important to a soldier to hit a horizontal line than a perpendicular one. In other words that he will have but little firing to do at a standing man but usually will have to shoot so as to sweep the edge of a rifle pit, shave the top of a log or crest of a knoll behind which his adversary is lying, and that if he does this, a little lateral deviation is unimportant.

The new drill book makes many improvements, but I cannot help thinking that the position it prescribes for off-hand firing is distinctly bad. With most riflemen to place the left elbow on the side with the hand back to the trigger-guard, brings the elbow on the heart and causes its pulsations to affect the aim. But if we admit that it is a good position for aiming at a target it ca nno

well be denied that it is a position most injurious for quick shooting. No sportsman would use it for hunting and it would be worthless in firing at a line of skirmishers advancing by rushes as prescribed in modern tactics. In such an advance, the men only show themselves for brief periods and are constantly changing their position. To hit them, the aim must be quick—almost like snap-shooting.

The new drill book very properly requires the soldier in loading to hold his rifle with the left hand at the balancing point and I fail to see how a soldier can load even a Springfield with rapidity, if he has to shift his left hand at every shot. As for working a magazine gun with the left hand in the position now prescribed, it seems to me to be very slow work. Any one who has ever shot in a "time match" knows he must hold his left hand at the balancing point of his rifle and keep it there to obtain good results.

All modern tactics require the soldier to be trained to fire a certain number of shots with the greatest possible rapidity (the "hell fire" of the Germans). This is prescribed in the new drill book. In advancing this will of course be delivered lying or kneeling, but to stop a charge it must be performed standing and any position of the soldier which is not the best for the purpose is bad.

Neither do I think that attention enough is given to volley firing, which I consider will be the fire of future battle-fields. I disagree with that portion of Major Pollard's valuable lecture to the Washington National Guard in which he considers that men cannot be trained to fire accurately by word of command, as I know by experience that if the officer gives his command properly the difference between volley and individual firing is surprisingly little.

The smoke from a volley lifts like the smoke of a single gun, (although this is of less importance with smokeless powder than with black). It permits the officers to direct the elevation and objects to be aimed at, *and above all to control the expenditure of ammunition.* The impact of the bullets of a volley can be seen under many circumstances, so that the range can be ascertained and the moral effect of many men being struck down at once is greater then when they drop one after the other. I noticed particularly that Lieutenant Greene says that at Plevna, the Turks who charged out after the repulsed Russians were broken and driven back by a few volleys; although the men firing them must

have been greatly disordered and scattered while the Turks were flushed with victory.

In Germany men are practised in firing volleys at different distances at targets of various sizes arranged so as to represent different bodies of troops. So also they are practised to fire with some of the rifles of a company set at one elevation and some at another, so as to throw a "sheaf" of projectiles which will fall like rain into an advancing enemy.

As far as I am informed there is very little volley firing in the Army, and what there is is only at regulation targets. The new drill book, however, makes an elaborate provision for the use of volley firing, and this I trust will cause an improvement in this particular.

To take up a smaller matter I cannot bring myself to think much of the back position for a soldier, the use of which is so universal in the army, although I always use it when I want to shoot well at a target. It seems to me that it brings the head so close to the ground that in most cases in the field the target cannot be seen. I also do not think it enables a skirmisher to seek cover, to fire from behind a knoll or log, to creep from point to point, and generally to perform as he ought the duties he will be required to perform under fire. As a rule, if a man shifts from the back position to the prone, the elevation of his rifle has to be changed, as the rifle barrel springs differently from being supported in a different manner. It seems to me the men should be trained to shoot in a prone position more than on their backs, and particularly that they should be practised to fire resting their rifle barrels on fence rails, mounds of earth, etc., which I think will be found to make a decided difference in the elevations required. Our army only fires in fine weather and when the men are fresh. In Germany they make bonfires to accustom the men to smoke between them and the target, and they practice in all weathers. Is not this common sense? In Russia they pay great attention to curved fire, where the target is concealed behind a parapet as troops would be placed in action. Why cannot we do something of the same kind in our Army? Perhaps we do, but I doubt it.

It also does not seem to me a practical thing to have skirmishers adjusting their sights as they advance, that is, after reaching a distance of 600 yards from the enemy.

Perhaps habit will make it a second nature and the squad

commanders will be able to enforce its being done. Nevertheless the probabilities to my mind are that in the excitement of actual combat the average soldier will start with his sights set for a high elevation and will leave them there.

This was the case in some of the battles of South Africa, particularly at Majuba Hill, where it is stated that while the enemy crept up to close quarters, the great majority of the British rifles picked up after the defeat had the sights set for 500 yards, their holders of course having fired over their opponents at a critical part of the action.

The account of these South African fights, in Nixon's History of the Transvaal, is an instructive lesson as to the importance of accurate firing. At Bronkers Spruit 236 British regulars in the open field were "wiped out" in 25 minutes by 500 Boer irregulars who had got the distance marked before they opened fire.

At Majuba Hill 400 British regulars on the top of a mountain were utterly defeated by a skirmish line of Boers who crept up under the fire of a second line which did not permit a head to be shown, and demoralized the British so that they broke and ran when the enemy appeared over the crest, while a bayonet charge would have saved the day. The Boers claim that they had but 450 men, but it is supposed there were 800. But these were all trained rifle shots at game in the field, although undrilled and undisciplined.

Can we expect a soldier under fire to do what a hunter cannot do in game? The latter may adjust the sights of his rifle for a single "pot-shot," but if his game runs he must "hold over" to hit it, and it is not often that he has time to alter his sights if he comes suddenly upon it.

It is perfectly simple to arrange a rifle so that any elevation up to 600 yards can be taken with reasonable accuracy without touching the sights. I have a 45-75 Winchester arranged in this way by bands inlaid in the barrel and it works to a charm up to 600 yards. One of its advantages is that if a man "gets rattled" he shoots low instead of high.

I also think that to get the best results out of skirmishing, the target should be brought towards the men. It is practically impossible to have men shoot day after day, as at army posts, over the same range and call it "unknown distances," when every stake and spot of grass is like the divisions on a measuring tape to them. But if a canvas target were to be slung to a pair of

wheels and drawn toward them by a mule and a wire rope, they would really have unknown distances to fire at, and something like war. Practice at such a target with the men behind a mound, would be most valuable for field work as well as being interesting.

I confess that my heart does not warm up to the Buffington sight, although I have not had sufficient practical experience with it to make my opinion of much value. But it always seemed to me that the Wimbledon authorities were nearer right than wrong when they ruled it out as not sufficiently strong and simple for war. The front bead and the divisions are very fine for dim light and the sight looks as if it would take a very cool hand to manipulate it under fire, and that it would not stand rough usage. It seems to me that a military rifle should have two sets of sights, one folding into the stock for fine long-range work, or for skilled shots to pick off heads and arms showing over an earth-work; the other strong and coarse with only one or two divisions (for short and mid-range), for rough, quick work by the average man. The Germans even ignore a wind-gauge and trust more to a "sheaf" of bullets from many rifles than to great accuracy with single shots. They also require the men to march to the range in heavy marching order and to practice frequently when so equipped. Do we ever do so? If not, how can we expect our soldiers to fire accurately in battle? If we do not drill our men to perform in practice what they will have to do against an enemy, is it not time we did so?

It is well known that every rifleman is a crank, full of ideas, which are usually directly in opposition to those of all his fellow cranks. These are simply my individual ideas. At the same time I assure you, as the candidate said, that while I feel strongly about them they "can be changed" if experience demonstrates they are wrong.

This experience can really only be gained by actual service and I know of no more valuable contribution to the military efficiency of our national forces than if a number of the officers who served in the recent Indian fights could be induced to tell us frankly just how the official system of rifle practice worked. Whether the back position was practised, how much the men altered their sights, and all about the questions in dispute, without regard to the Ordnance Department or any one else.

Such a paper would be worth a hundred times the guesses of a "back number" like the present writer.

CIVIL WAR IN CHILE.

By CAPT JOHN J. O'CONNELL, 1st U. S. Infantry.

WHATEVER may be the feeling of Chile's people towards the United States now, time was when we had no warmer friend than this high-spirited republic of the South. It was during the Civil War, when this nation was struggling desperately for life. Chile was enthusiastically on the side of the Union. Her people contributed more money to the Sanitary Commission for the benefit of the Northern sick and wounded soldiers, than was sent for a like purpose through all the other legations combined. The Chilean authorities, moreover, at that crucial moment in our history cheerfully acknowledged and paid with interest a large claim that had originally been preferred against their government by ours as early as 1819.

As the war came to a close, news from the North was awaited with extreme eagerness by the people of Chile. One night in the spring of 1865, the American Minister at Santiago was awakened from his sleep by a band of music playing "Hail Columbia" in front of the legation. Making his way to the balcony he was hailed by a venerable man, the President of the Chilean Republic. "Richmond is fallen," the President shouted, "Lee has surrendered," and the music began again, mingling its joyous notes with the glad cries of the people. It is well to recall the past at this juncture when hostility to Chile is sought to be made a test of American patriotism. The American people happen to be endowed with good sense, and are aware that if there is ever a time when it is more incumbent upon men than another, to divest themselves of partisan heat and national bias, it is when war has been suggested as the solution of a difficulty. The first duty then is to be sure we are right before going ahead. However, should circumstances so shape themselves, that at some future period, we may be forced into a war with Chile, the undertaking would be most difficult and expensive.

Imagine a narrow strip of land 2500 miles long, varying in breadth from 100 to 200 miles, with its back to Europe and its face to the Pacific Ocean, and you have Chile. It comprises three

distinct regions,—the north, centre, and south,—with a population of three millions in round numbers. The natives are not all of the indolent half-breed type found close to the equator. As you go south the complexion grows whiter, but even in the temperate climate of Valparaiso, it never can be compared in brilliancy with what we call an English caste. Considering that the Chilean of to-day is an amalgamation of Spanish, Indian and Negro blood, it is surprising that the country should have attained the prominence it has in South American affairs.

The war with Peru from 1879 to 1882, in which Chile was victorious, rendered that republic not only wealthy, but arrogant and dictatorial towards the other South American republics. Triumphant on land and sea at Iquique, Pisagua, Tarapaca, Tacna and Arica, Chile broke the heroic resistance of the Peruvians in the bloody battles of Miraflores and Chorillas and dictated peace within the walls of Lima. The fortunes of Peru and Bolivia were wrecked in this conflict, the former losing a large and valuable mining territory to the victors. Chile now assumed the position of the leading republic south of North America, and immediately initiated the necessary measures to maintain her ascendency. She began by re-organizing her army and navy on a solid and efficient basis, modelled on the military powers of France and Germany, inviting able officers of the latter nation to command and drill her regiments, and organize her victorious army on the lines of modern warfare. Officers were sent to Europe to study the military improvements of the day. An Escula Militar was founded at Santiago and an Academa de Guerra and military club. The Republic of Chile recognized the necessity of an army and navy to maintain its newly acquired proud position amid her sister republics.

In a measure the Chileans are the Prussians of South America. They manifest a more martial spirit, are better drilled, com manded and organized, than the other southern armies. The officers are of a Spanish type, wear natty uniforms, French style, and present a fine military appearance. The rank and file are of a dark skinned, semi-Indian type, ignorant and savage, who have recently demonstrated that they can fight like demons, kill, plunder and burn with a ferocity that baffles history to furnish a parallel. This army consisted in 1890 of two regiments of artillery, eight battalions of infantry, three regiments of cavalry, one battalion of sappers and miners and one battalion of coast artillery

—total 6000 men and 950 officers. Besides this regular force, there is a national guard of 50,000 organized troops which can be mobilized at short notice when needed. This very large force for so small a population is armed with one of the very best modern magazine breechloaders—the Mannlicher rifle, magazine holding ten cartridges—a weapon greatly superior to the American Springfield rifle now in the hands of our small army of 20,000 men. The government is building fortresses at various points along its coast, and large purchases of guns of the most improved European pattern are being made to mount in them.

The Chilean republic is prouder of the brilliant victories of its navy, than of aught else it possesses. It is making herculean efforts to perfect and enlarge its sphere of efficiency, and although the public debt is 47,000,000 dollars, expense is no object in its present policy of adding to its strength several new line of battleships such as the *Capitan Prat* and *Presidente Pinto*, two of the most formidable ships afloat. Its navy now consists of two ironclads, each of 2033 tons, a number of 1130 tons, two corvettes of 1101 tons, a cruiser of 3000 tons, another of 465 tons, ten torpedo boats of from 40 to 400 horse-power, an iron-clad of 6902 tons and two torpedo boats that are being built in England. The following are among the most conspicious for their gallant records, viz.: *Blanco Encalada*, *Almirante Cochrane*, *O'Higgins*, *Abtao*, *Almirante Lynch*, *Esmeralda*, the monitor *Huascar*, the gunboat *Magellanes* and the torpedo boats *Condell* and *Pilcomayo*. These ships are manned by 1600 men, and commanded by 123 officers. There is an excellent naval college at Valparaiso and a naval club and periodical at the capital. The weak point in the system is that there is no arsenal, no dry-dock; and when a ship needs repairing it must be sent to a foreign port.

In 1885 Chile was at the zenith of her good fortune, when President Santa Maria called Balmaceda to power as minister of foreign affairs. The choice was applauded, his presence consolidated the Cabinet and brought with it strength and prestige.

Don José Manuel Balmaceda was born at Santiago in 1840, of wealthy parents whose family had occupied prominent positions in the affairs of the Republic. He was destined for the priesthood and was sent to the Seminary of Concilias, where he received a careful, religious education, but he possessed by nature the reverse of a clerical turn of mind. He was essentially a man of

action, ardent, impulsive, and instinctively a politician. He soon exchanged the Seminary for the University, where he graduated and began his career soon after by being elected member of the Reform Club, then frequented by the young men of liberal ideas of Santiago. From the very first he exhibited striking qualities as a brilliant and persuasive orator, and at the age of 28 was looked upon as the leader of one of the three political parties that competed for the government of the commonwealth. He represented the Liberal Party, which had the largest representation in Congress, but was held in check by the coalition of the Conservatives and Nationals. The ideas advanced by the Liberals, who were recruited largely from the university and college men, alarmed the Conservative Party,—composed mostly of capitalists, landed proprietors, dignitaries of the Church and State officials,—and the Nationals, around whom grouped mechanics, lawyers and men of liberal professions, who, though sympathizing with the Liberal Party, repudiated their radical theories. They asked for reform, but not for revolution; a revision, but not the abolition of the Constitution of 1833, to which they considered Chile owed her prosperity. Elected to Congress in 1868 by his native town, Balmaceda justified the hopes of his party and was re-elected five times. Each term increased his popularity until he became indispensable to his party, and was offered a place in the Cabinet by President Santa Maria. Balmaceda, having reached the goal of his ambition. for which he waited 15 years, exercised his power at first with prudence and saw his popularity and prestige daily increase. He looked higher, and public opinion marked him for the successor of Santa Maria, whose presidential term was near its end, and the latter encouraged his favorite minister in his ambition and promised him his support. The election campaign opened in 1886 and the Liberal Party chose him for its candidate. His wisdom and moderation gained over the National party, and the Conservatives, reduced to their own numbers, could not oppose him with a candidate that had any hope of success, so that Balmaceda was elected President of the Republic on the 18th of September, 1886, by a large majority.

The good fortune that raised him to the first office in the nation, stood by him until he became false to himself, and accordingly the first three years of his incumbency were among the most prosperous that Chile ever knew. He regarded only the practical measures of the platform of his party and carefully initi-

ated reforms demanded by public opinion. He organized an excellent system of public and normal schools, gave a fresh impulse to the improvement of rivers and harbors and the construction of railroads. Notwithstanding these great public expenditures the revenue showed a decided increase. At this time he was the idol of the masses. He heard himself proclaimed the Washington of Chile, the first of the presidents of South American republics. It would be an interesting psychological study to analyze the thoughts of Balmaceda at this period, and discover the evil influence that obscured an intelligence until then so lucid and held in masterly command. It was thought that his minister Sanfuentes was his evil genius, but then he sacrificed him, though late, at the entreaties of his friends.

We will here merely touch on the events that led to the sudden conflict between the President and Congress, a clap of thunder in a clear sky and prelude to the civil war that has left Chile bleeding at every pore. As Santa Maria had manipulated the wires in favor of his successor, so Balmaceda meant to take a hand in the selection of his. He had at heart the successful termination of the great works of public improvement inaugurated by him, and he held it a great hardship that the Constitution did not permit the election of a president while in office. So great was his personal popularity that he was sure that his views in this matter were participated in by the majority of the voters, and that his nomination of a successor would be ratified by them.

This man was Henry Sanfuentes, his minister of Industry and Public Works. This secondary position assumed considerable importance in consequence of the magnitude of the projects for ulterior improvements planned by the President, and Sanfuentes soon took first place in the Cabinet. The President saw in his favorite minister a suitable instrument to carry out his intentions, but the selection was not made in the interest or to the satisfaction of the Liberal party, which contained within its ranks many more prominent men whose aims were nullified by this presidential intervention.

Sanfuentes was not popular with his colleagues, who looked with disfavor on his pretensions to the highest office, his patronizing manners, and the secret complaisance with which the president always put him forward. Balmaceda, in consequence of the entreaties of his friends and the remonstrances of prominent liberal members of Congress, halted in his pet project and postponed

action for the present, Sanfuentes retiring from the cabinet. The more he coquetted with the perilous scheme which must end in a desperate conflict with Congress, the more irritated he became with the Constitution of 1833, at once monarchial and republican in tendency, and the more eager to abolish its conflicting principles. It placed him above the law in denying the right to impeach him while in office, and refused him the power to dissolve Congress in case of conflict and to order a new election. As president he was impeccable, but his ministers were responsible to Congress, and if he declined to remove any of them at its suggestion, the conflict would either result in nothing or in revolution.

Having maturely weighed the matter, he thought himself of sufficient strength to enter upon that conflict, although he did not at first anticipate the necessity of using force. He retired his cabinet and selected one composed of his personal friends whose first act was to dissolve Congress. Having swept away one obstacle, another was met in the Congressional Committee, which by law succeeded Congress, and consisted of seven members of each house of Congress whose duty it was to supervise the acts of the executive and to demand of the President the convocation of Congress should they deem such measure necessary for the public good. This was the body that showed the first symptoms of resistance, roused public opinion, took the charge of military affairs, and directed them until the end of the contest. It began by remonstrating against the premature and arbitrary dissolution of Congress, which left most of the appropriation bills unpassed, and especially those for the support of the Army and Navy; to which the President replied by an order issued on the 1st of January, 1891, appropriating money for the public expenses, increasing the pay of the Army and Navy, proclaiming martial law, and suspending the right of Assembly and the liberty of the press. It was the peremptory order of a dictator requiring unconditional submission, and the first act of the civil war. A second decree abrogated certain principles of the Constitution, which abrogation, by said Constitution, required the affirmative action of two successive Congresses to accomplish legally, and ordered a national election to take place on the 19th of March for members of Congress.

Balmaceda could not have been ignorant of the gravity and illegality of these acts, but he believed, or affected to believe, that he

had public opinion on his side. He had at least the support of the army, whose pay he had doubled, and he probably convinced himself that he was acting for the best interests of the country; that a revision of the constitution was imperative, and that it would result in his re-election, which was essential to the greatness and prosperity of Chile.

The Congressional Committee responded at once by declaring these acts of the President illegal, and releasing the army and navy from their oath of obedience to him. An order from the President of the chamber of deputies, and one from the Vice-President of the Senate, directed the army and navy to protect the meetings of the commission. The army ignored the order and the navy responded by revolting from Balmaceda on the 6th of January, offering an asylum to the commission, now a committee of safety, on board a ship, and embarking with them to blockade the ports of the northern provinces, which constituted the chief source of wealth of the country.

Iquique and Pisagua were important shipping points, and their occupation would deprive Balmaceda of great resources, but would not ruin him, for he had the army,—30,000 good troops—finely armed and equipped, and a large sum in cash. He held the large towns, the *Almirante Lynch*, *Condell*, and *Pilcomayo*, which naval force would be speedily strengthened by battle-ships then under construction in Europe. The Committee of Safety, now "La Junta," had at its disposal 22 ships, war and transport, among them the *Blanco Encalada*, *Almirante Cochrane*, *O'Higgins*, *Esmeralda* and *Huascar*, commanded by Captain Montt. It was a matter of vital importance to act at once, and profit by its temporary superiority afloat to carry the war into the very heart of the enemy's country in order to raise and encourage its sympathizers and friends and afford a rallying point to the discontented and disaffected. Accordingly Captain Montt decided to strike the first blow at Coquimbo, an important sea-port 300 miles north of Santiago.

The fleet opened fire on the town on the 17th of January, and having easily silenced the land batteries, landed a force which pushed its way into Coquimbo, of which place it became master after a short fight of two hours. The capture of Coquimbo, though temporary, was a menace to Santiago. Balmaceda therefore detached from the army at the capital 3000 men who were ordered to form a junction with the reinforcements

from Iquique under the walls of the city and retake the city. The operation failed, the northern troops having been disaffected by contact with the partisans of the Junta. This double check sustained by Balmaceda, was partly compensated for by the failure of the Junta's fleet before Valparaiso—a fortified port which it attempted to capture by a *coup-de-main*, the landing of the Congressionalists being easily repulsed.

The operations energetically carried on in the north by the Junta, revealed a state of affairs not very reassuring for Balmaceda. Mistress of the sea, the fleet blockaded Iquique and Pisagua, thereby paralyzing the exportation of nitrate and minerals and the collection of customs. In this populous region food was scarce. Flour, meat, vegetables, were brought from a distance. Thus a few days of blockade was sufficient to starve a mining population already more in sympathy with the revolution than with the President.

Balmaceda ordered 10,000 men to reinforce the garrisons of the north to supply the place of those ordered to Coquimbo; and 7000 were massed at Aconcagua under the command of General Barbosa to cover the approaches to Santiago. The troops stationed about Iquique, which was defenseless in the rear, were occupied in resisting the attempts of the fleet to land its forces. Meanwhile the irritation of the blockaded towns increased rapidly and the people began holding secret intercourse with the assailants. Apprehensive on account of this state of affairs General Soté, commander of Balmaceda's troops, resolved to occupy Iquique. He met with determined resistance on the part of the citizens which he could easily have overcome had it not been for the enemy's fleet which, at the first shots exchanged, let loose its batteries on the town, reducing it in a short time to a mass of ruins and successfully landing their men. Soté was defeated and forced to retreat precipitately leaving on the ground 1200 dead, and valuable war material in ruins in the city. The fall of Iquique influenced that of Arica and Tacna on the 7th of April, which capitulated without resistance, and Balmaceda's troops, nearly surrounded by those of the Junta, were compelled to seek refuge on the Bolivian frontier. The northern provinces were lost to the President and Iquique became the headquarters of the Junta. It had now a capital, an army, fleet, and territory, and thought the hour had arrived to demand the rights of belligerents, and, relying confidently on the recognition of the United

States, sent Pedro Montt to Washington as its representative on that mission. He failed in his errand, not that the Junta had relied too much on the friendship of the United States, but it had forgotten to consider the precedents created by its State Department during the American Civil War, and shortly thereafter in the Civil War of its southern republican neighbor.

When, in November, 1861, President Davis sent Mason and Slidell to England and France on a similar errand, Secretary Seward promptly instructed United States Ministers Adams and Dayton to notify these powers that the United States would recognize the official reception of the envoys of the Confederacy as an act of hostility, and would immediately withdraw its representatives. In the matter of Maximilian the Washington cabinet followed the same precedent, and not only did the government refuse to receive those sent by him, but returned unopened an autograph letter of the Emperor expressing sorrow at the death of President Lincoln. The government therefore consistently refused belligerent rights to the Junta, and the fact that Spanish America is only too often the theatre of revolutions, justified deliberation.

Although the government refused belligerent rights, it did not cease to be interested in Chilean affairs, and the occasion appeared favorable to assume the part of mediator, thereby carrying out in part the programme developed by Secretary Blaine at the recent Congress of the three Americas. The United States representative to the government of Chile, Mr. Patrick Egan, was charged with this difficult task, and began his efforts as peacemaker on May 24th, when he informed Secretary Blaine that the good offices of the United States, Brazil and France, had been most cordially accepted by the government of Chile and the revolutionists. The negotiations were broken off, the result of an attempt to assassinate Senor Godoy, one of Balmaceda's ministers. The envoys of the Junta having obtained safe conducts for this peace conference from Balmaceda, which he afterwards attempted to withdraw, were placed on board the United States Cruiser *Baltimore* and landed at Callao in Peru. Hostilities continued with varying results by land and sea, but it was becoming evident that, notwithstanding a few partial successes, Balmaceda was losing ground and the number of his enemies was increasing.

At the end of April his star appeared to have been in the as-

cendent, when the *Blanco Encalada*, one of the most formidable cruisers of the Junta, anchored in the harbor of Caldera, was sunk before it could weigh anchor, having been suddenly attacked by the *Lynch* and *Condell*. The fight was short and bloody, more than two hundred of its crew perishing in the fight and in the waves. This loss was sensibly felt by the Congressional party. The bold attempt of this cruiser, in the harbor of Valparaiso a few days previous to its destruction, had caused great alarm in that city. Its captain having learned that the government had equipped a powerful tug,—the *Florence*,—and converted it into a gunboat, silently slipped into the harbor on the night of April 12th, with the intention of blowing it up. A badly-aimed torpedo failed to reach the tug, but blew to pieces the floating dock to which it was moored. The noise of the explosion gave the alarm and the *Blanco* withdrew. On the night of the 18th of April, a torpedo boat escorted by the *Florence* started out to find the *Blanco Encalada*, which was still off Valparaiso harbor but had been joined meantime by the *O'Higgins*. The insurgent ship discovered its pursuers and delivered its fire so effectively, that they turned back and endeavored to regain the harbor at full speed. Not deterred by the fire from the forts, the *Blanco*, accompanied by the *O'Higgins*, continued in pursuit until a well-aimed broadside swept the deck of the *Florence*, one ball going through its hull and sinking it with all its crew. The torpedo boat was getting away rapidly when it was struck amidships by the *O'Higgins* and also sunk. At this time the forts concentrated their fire on the *O'Higgins*, and struck her, killing a number of her crew, to which the *Blanco* replied vigorously, drew the fire of the enemy and saved her companion. The *Encalada* accompanied by the *O'Higgins*, then put to sea, and shortly arrived at Caldera where it ended its brilliant career.

The Junta hoped to repair its loss in part, by the arrival of the *Itata*, freighted with arms and ammunition from the United States, and which the insurgents had forcibly taken from the South American Steamboat Company. Our Government, careful to preserve its neutrality, suspended the departure of the vessel and ordered her held at San Diego. The Junta had hardly received this unwelcome piece of intelligence when the glad tidings came also to hand that she was anchored in the harbor of Iquique, having successfully eluded the vigilance of the United States authorities. The *Itata* was closely pursued by the cruiser

Charleston and finally was surrendered on the demand of Admiral McCann. This unfortunate incident of the *Itata* produced a bitter feeling among the Chilean masses against our people.

The regret caused by the loss of the *Encalada* and the capture of the *Itata* had scarcely subsided, when the hopes of the Congressionalists received a new impetus from the marked success of the *Esmeralda*, which had returned south from her two months' search of the *Itata*. On the 15th June she attacked and blockaded the port of the Island of Lobos, which contained rich deposits of guano and formed one of the chief financial resources of the government of Balmaceda. At this time it became known that the large force concentrated by Balmaceda at Coquimbo was daily becoming dissatisfied; that one battalion had mutinied, killed its officers, and marched towards Caldera to join the Congressionalists of whom 8000 occupied the town. The revolutionary fleet was anchored in its harbor and Coquimbo was to be attacked by land and sea.

The presidential election was held at the end of June, and only the provinces of the centre and south took part in it. Balmaceda's candidate, Don Claudio Vicuna, was elected and was to assume office on the 18th of September. Master of Santiago and Valparaiso; strongly intrenched at Coquimbo, which had been recaptured from the Junta; the approaches to the capital well defended; assured of the support of the southern provinces and awaiting day by day the arrival of war vessels from France, Balmaceda was still in condition to exact honorable terms from his enemies and thereby avoid imminent disaster; or to risk all in attempting fully to establish his authority. He chose the latter alternative, probably on the following grounds. Having been elected the Executive of the Republic and delegated to maintain order and assure the permanence of the public service, he conceived it his duty to substitute himself for a Congress that had failed to do its duty by refusing to vote the appropriations for public expenditures. On the other hand Congress, to justify itself, alleged that the Cabinet chosen by the President had not its confidence, but this Cabinet had succeeded two others that this Congress had retired, without any tangible reason. The Junta held that Don Claudio Vicuna had no right to the presidency, his election being unconstitutional in form and fact. Instrument of Balmaceda, and nominated by him for the suffrages of the people, he was chosen only to give an appearance of legality to

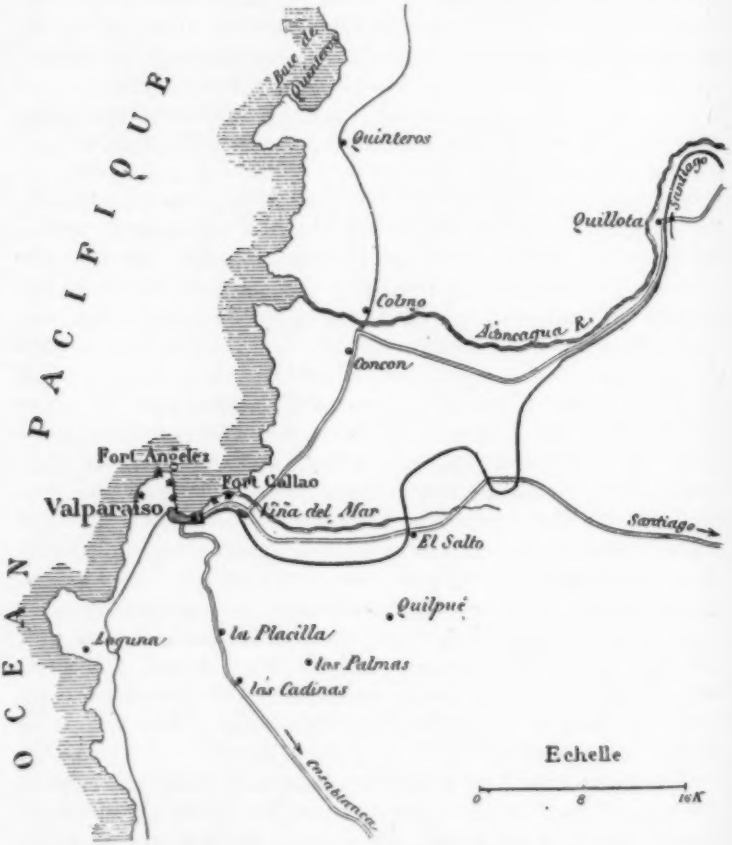
the most palpable violation of law and to the ambitious intentions of a despot.

Between these two extreme and obstinate opinions force alone could decide. The conflict acquired each day a more bitter character, political hates being mixed with private animosities. This was patent in the capture of Iquique and in the odious measures taken against the avowed or supposed partisans of Congress. Terror reigned in Santiago, where sudden disappearances of persons who had friends in the Congressional Army caused great alarm. There were plots and counterplots and the capital became depopulated. The young men of the best families emigrated to escape the surveillance of the police, and, disguised as sailors, stokers and tradesmen, reached Valparaiso, where they shipped for the North, centred around Iquique or Tacna, and took service in the Congressional Navy. They played a prominent part in the attack on Arica by the *Aconcagua* and *Magallenes*.

General Errázuriz, commanding the army of the Junta at Iquique and master of the northern coast from Tacna to Caldera, was ordered south to support the naval attack on Coquimbo. To do this, it was necessary to concentrate his army at some point where it could be subsisted and foraged. Huasco, equally distant from Caldera and Coquimbo and situated in the centre of a fertile basin, combined these requisites. The attack on Coquimbo masked one of much more importance. The Junta determined on beginning an energetic and decisive campaign. The following reasons led to this resolution: Balmaceda had issued a call for 60,000 men and $60,000,000 in paper money,—his expected vessels from France could not be much longer delayed,—dissatisfaction with Balmaceda was gaining in the Centre and South,—and a prolonged contest must necessarily weaken the forces of the Junta. The advice of General Canto, a veteran of the Peruvian war, was taken, and it was decided to attack Balmaceda in Valparaiso itself.

On the 20th of August six Congressional transports entered the bay of Quinteros, 20 miles north of Valparaiso, and landed there an army of 8000 men. Balmaceda had not foreseen this movement, which, after the first moments of surprise, he considered as indicative of the desperate condition of his enemy, who in his impatience was driven to risk all under unfavorable circumstances. Balmaceda had at hand a large and efficient army which occupied his chief seaport, abundantly supplied from the

interior by railroad. He could rapidly concentrate detachments from Santiago, Coquimbo, Valdivia and Talca. His army at Valparaiso had in front of it a double line of defenses, the Aconcagua River and the intrenched lines of Viña del Mar; to their rear, Fort Callao armed with powerful guns and the batteries of the port as shown by the following sketch.



At the head of the Congressional army was General Canto, who inspired his men with implicit confidence and exacted blind obedience to his commands. In the late Peruvian war he had acquired on the field of battle a merited reputation for audacity and strategy, and now commanded an army better equipped and

provided with magazine guns than that of Balmaceda, which latter was also handicapped with two generals, each of whom aspired to the chief command which Balmaceda ought to have himself assumed in order to avoid consequent want of unity of action and therefore possible disaster. One of these,—General Barbosa,—had distinguished himself in the battle of Tacna in 1880 under the command of Baquedano, and later at Torata ; and the other,—General Alcéreca,—although less known, enjoyed a merited reputation for bravery in presence of the enemy, and the President put much reliance in his energy and devotion.

As soon as it was known that Canto had landed his army, Balmaceda gave orders to have his troops massed on the left bank of the Aconcagua and prevent if possible its passage by the enemy. Canto did not hesitate, however, to undertake it, supported by his fleet at the mouth of the Aconcagua whose fire obliquely swept its course, and by a line of fire from his field artillery with which he crowned the heights in his rear, which neither Fort Callao nor the batteries of the port, being out of range, could silence. He had before him the vanguard of the Balcemedian army, the principal part of which occupied the line of Viña del Mar which was strongly supported by Fort Callao and constituted a very formidable line of defense. As detachments arrived from north and south they were directed to this point where the greatest resistance was expected to be made, while on the line of the Aconcagua, there were not more than 12,000 men. The battle opened with a furious cannonade under cover of which General Canto crossed the river, pushing vigorously the Balmacedists before him, completely surprised at the impetuosity of the attack. They retired in good order and skilfully profited by every advantange the ground offered to resume the offensive, which became more effective as they retired out of range of the guns of the fleet and upon the heights towards Viña del Mar, where they arrived at sundown when darkness put an to the slaughter. Canto halted his battalions in front of the intrenched lines of Viña del Mar, occupied by 13,000 fresh troops reinforced by those he had driven before him. The battle of Aconcagua was a success, but far from a decisive one. The river was crossed and the enemy thrown back on Valparaiso, where the serious difficulty began. Before him was an army of equal bravery, superior in numbers, in strong intrenchments and supported in the rear by a strong fort and the batteries of Podetto,

Andes and Valparaiso: in case of defeat a hazardous embarkation in a narrow bay under the fire of a victorious enemy,—conditions that offered no alternative other than complete victory or irretrievable ruin.

The Congressionalists strongly believed in the ability of their general and in the success of their cause, and General Canto justified their confidence. By a skilful flank movement he captured the railroad below Valparaiso at Salto which connected that port with the capital, leaving only a fragment of it in the hands of his adversary. By this *coup-de-main* he intercepted Balmaceda's communication with his capital, reinforced his army with the numerous malcontents of that city and those that ever follow success, obtained the means of subsistence for his troops, and opened a secure line of retreat in case it were required.

The population of Valparaiso awaited with impatience the result of the combat which was to decide its fate, then taking place beneath its very walls.

During the whole of August 22d, was heard the growling of artillery mingled with the shrill whistling of musketry, Canto's army gained ground, as attested by the long line of ambulances that brought the wounded to the city, indicating also the magnitude of the action. It was known that the bulk of Balmaceda's army held the position of Viña del Mar supported by Fort Callao; that it was constantly reinforced, and those who sympathized secretly with the Junta doubted that Canto, with all of his ability and with all the bravery of his battalions, would be able to capture the position, in which opinion the officers of the foreign fleets anchored in the harbor agreed. Balmaceda and his lieutenants, notwithstanding their check of the day before and failure to defend successfully the passage of the river, were full of hope, being aware that the Congressionalists had suffered great losses and that the reinforcements received by them did not fill up the gaps in their ranks. During the night they rushed ammunition into Callao, Podetto, Andes and Valparaiso, and hastened troops to Viña del Mar. Canto was not idle. He ordered his fleet from the mouth of the Aconcagua, where it was now useless to him, to Valparaiso, where it could be of service exchanging fire with the forts. He left his ships only sufficient men to manipulate the guns, and reinforced his army with the remainder of the crews.

On the morning of the 23d, at break of day, the Congression-

alist artillery, on the heights to the north of Viña del Mar, opened a hot fire upon Fort Callao, whence the Government artillery, which was posted there, replied vigorously. The attack was supported by the *Almirante Cochrane* and *Esmeralda* from seaward. The artillery duel was intended by Colonel Canto as a prelude to an advance against the position of Viña del Mar. The Third Brigade was to assault the centre, the Second, the left wing, and the First, the right wing, driving it down to the sea; but half an hour after the batteries had got into action this plan was suddenly given up. A brief council of war was held, and presently the entire force fell back into the gorges of the hills, while a body of infantry, two companies of sappers, and a half squadron of cavalry were dispatched into the interior. Canto had become convinced that the position of Viña del Mar could not be forced by direct attack, and had therefore determined upon a turning movement by which he hoped to approach the city from a side upon which it was comparatively defenseless.

The project offered serious dangers, for it separated him from his base of operations and from his fleet, his only resource in case of defeat. Balmaceda suspected his intentions and manœuvred to cut him off from his fleet. Both armies passed the 25th, 26th and 27th skirmishing, in order to mask their intentions. On several occasions a general engagement was imminent, but Canto always declined. He had good reason for doing so. His success had emboldened the enemies of Balmaceda within his own lines who flocked to his camp and reinforced his much depleted ranks. He was aware that discord reigned in the camp of the enemy and that Generals Barbosa and Alcéreca each refused to accept the responsibility for the check at Aconcagua and intrigued for the command of the army. The conflict between them had assumed an acute state and had progressed to open hostilities.

Canto's flanking manœuvres on the 25th, 26th and 27th of August, resulted in a change of position to the Heights of Placilla which overlooked the town of that name, situated about seven miles nearly due south of Valparaiso.

Balmaceda had discovered the movement in time to establish his forces in a strong position near Placilla and astride the road leading to Valparaiso, and on the 28th of August the advancing Congressionalists found the Balmacedists awaiting them. A fierce and bloody conflict ensued which resulted in the total defeat of Balmaceda and the death of his Generals Barbosa and

Alcéreca. Vainly did the officers of Balmaceda endeavor to rally their men, they were deaf to all entreaties; the reserves, composed of volunteer regiments, refused to obey, raised the standard of revolt, and joined the victorious army of Canto. *Sauve qui peut* was the order of the hour and a human flood plunged in an indescribable panic into Valparaiso. The city was surrendered the same evening.

Balmaceda was abandoned by all save the Captain of the *Almirante Lynch*, who, being asked to surrender to the fleet, answered the summons with a broadside, and then lowered his colors to superior numbers.

The fallen President fled to the bay of San Antonio where he hoped to meet the *Condell*. Not finding it he returned by night to the city and asked Mr. Urreburia, the Argentine Minister, for an asylum, which was granted. Here he remained until the 19th of September in perfect seclusion, the secret of his hiding place being known only to the Minister and an old faithful servant. In almost solitary confinement he brooded over his affairs, and, despairing of justice from his enemies and of any hope of escape, he blew his brains out at eight o'clock in the morning of the 19th of September, the day on which his term of office expired as President of the republic. Thus terminated at the age of 51, the career of a remarkable man who was for twenty years the idol of the Liberal party of Chile, three years the popular president of the republic, and eighteen months the object of its most bitter hate. He left Chile bleeding and devastated. He had lost his army, fleet and treasure. Flight was impossible, still more impossible was the return of fortune. By an act of despair he judged, absolved and killed himself. The career of this man is a striking example of the oft proven fact that excessive prosperity is one of the greatest trials that either nation or individual can experience.

Comment and Criticism.

(The remarks under this head have, generally, been invited by the Publication Committee, which desires that, as far as practicable, these "Comments" should appear under authors' names.)

I.

"Position Finding Service."

Capt. S. M. Mills, 5th U. S. Artillery.

IN an article of the March number of the JOURNAL on the above named subject, by Captain James Chester, 3d Artillery, he takes occasion to say, p. 238:

"The plotting board should be graduated on the edge to read to minutes. Such a board was successfully operated at the Artillery School for several years, but with the perversity peculiar to theorists the simplicity of the old time plotting board has been destroyed by the introduction of protractors with verniers reading to minutes, and requiring the use of magnifying glasses. This is simply pedantic, and shuts the door of position-finding usefulness against a large class of non-commissioned officers, etc."

This criticism is not at all warranted by the facts. The plotting board referred to by Captain Chester was used here very satisfactorily for many years; the brass edges in time however got loose from the board, the board warped and shrunk, and it became necessary to get a new board or adopt a new system. It will be remembered that under the system of plotting shots, the edges of this board were graduated for a fixed and permanent base line, and one of the extremities of this base line was at the Rip Raps, some distance from the main land, requiring the use of a boat's crew every day of the practice to reach it. This base line also necessitated the employment of a submerged cable for telegraphic purposes, which it was difficult to maintain and keep in order on account of the current and loose rocks surrounding the Rip Raps. A new board with the graduated edges on brass, it was found would cost something like four hundred and fifty dollars, which expense was of course out of the question; the experience here gained also was that the target practice should not be dependant upon one base line, and that base line difficult and inconvenient to reach at times, but that we should have several base lines, located on the mainland and with reference to the different batteries from which firing would take place, and one or two within the limits of the fort itself. These are some of the common sense reasons, based upon practical experience and the necessities of extended practice at this place and not "the perversity peculiar to theorists," that induced the authorities of the Artillery School to try some other system for ordinary target practice, which would be cheaper, and would permit the use of several base lines on the same board, which the old board with brass graduated edges would not do.

The system adopted required the use of large size protractors, which could be fastened at the extremities of any base line on the board corresponding to that at which the observers were located. We are all familiar with their use.

These protractors are always found in stock and can be purchased from any of the large instrument makers, and I believe for $30 a pair. The system works admirably, notwithstanding we use magnifying glasses to read the verniers, which are no more difficult to read than the verniers on other instruments, which all our non-commissioned officers are required to read and do read after a little practice and experience.

The system works so well, that with non-commissioned officers as observers at the extremities of the base line, and as telegraph operators, and at the plotting board, observations are taken, transmitted by telegraph and plotted on the board *every 30 seconds*. There can be very little time consumed or wasted in reading verniers to do this, nor do I see anything "pedantic" in teaching them to do it or in its use. The door is not closed against them, but on the contrary the practice and experience gained in the use of this system will make them more ready to comprehend and use the "Position Finding Service" advocated, or any other system, when the proper time arrives.

Captain Chester in his haste to force us along overlooks the fact that the system in vogue at the Artillery School and which he criticises is simply *for artillery target practice*, and for that purpose, with the guns and the facilities that we have, I think meets that end. When we get our modern works and guns with permanently located batteries and base lines, the extremities of which will be protected, then the plotting board with its graduated edges may be useful in the manner described by him in position-finding.

II.

"The German Torpedo Shell."

Capt. E. L. Zalinski, 5th U. S. Artillery.

THIS shell is more properly a shrapnel, with the bursting charge of gun-cotton or other high explosive placed in the front. Its object, as has been stated, is to attain with its fragments troops covered by field intrenchments, both by their increased angle of fall when burst almost directly overhead, and when burst just beyond them. It was devised by the Prussian branch of the German artillery to avoid the necessity of special guns or mortars for curved fire. Both the Saxon and Bavarian artillerists favored the use of field mortars, the Saxons having actually constructed and equipped a battery of them. Theoretically, the torpedo shell should answer the purpose, but practically there are several "ifs" which do not appear to have been given sufficient weight in deciding against the introduction of field mortars.

To use the torpedo shell as proposed implies ability,—1st, To pick up the range with very great accuracy;—2d, To have a time fuse of greater accuracy than has thus far been found to be possible, particularly when applied to high-powdered guns such as are now proposed to be used. But granting that the required accuracy of range-finding, fire, and action of the time fuse, are attainable, it would be a comparatively easy matter for the intrenched troops to guard largely against this reverse fire by throwing up breastworks in rear.

We have given, as results of Austrian experiments with similar torpedo shell weighing seven kilogrammes, about 800 fragments on bursting. Of these 200 are over 10 grammes each in weight (10 grammes=154 grains or, say, less than two-thirds the size of the present small bore rifle bullets), and 600 fragments between 1 and 10 grammes, with 800 grammes weight of fragments too small to be considered. A large proportion of these pieces will be ineffective for reverse fire by reason of being projected upward

and forward without attaining a target. The greater portion of those thrown backward will rapidly lose their effectiveness from their irregular shape and small mass, and will have but a slight penetrative power. The troops could therefore guard themselves from this reverse fire by throwing up only a comparatively thin breastwork, although it might be advisable to make it as high as circumstances will permit. As troops will now be well equipped with intrenching tools, these slight rear breastworks can be thrown up with but little difficulty. To keep the covered troops thus occupied will be rather an advantage than otherwise, as, when busy, their *morale* is much less likely to be affected by surrounding conditions.

It would appear from all this, that vertical fire by means of field mortars is the most certain of attaining the destruction or demoralization of intrenched troops. The question of the calibre to be thus used is still open. It is obvious that the objective of the attack by the curved fire of field mortars will be the troops rather than the levelling of the intrenchments. If this latter were the chief objective, a large calibre, such as that adopted by the Russians (6-inch), might be advisable. It would be next to impossible to improvise effective overhead cover for large bodies of troops. The larger calibres of field mortars designed for breaking down such cover are bulky to transport, and their ammunition must, for the same reason, be necessarily limited. It would therefore appear advisable to limit the calibre to one which, both in itself and in its ammunition, is very portable.

The 3.6-in. field mortar now making by the Ordnance Department is a very suitable calibre, the weight of gun and carriage being only about 500 pounds, and its shrapnel being 20 pounds. These could be carried in a one-mule cart, containing in addition a small number of rounds of ammunition. Another one-mule cart could carry additional ammunition for each piece. Four cannoneers and two drivers would thus suffice for each piece. The mobility of these pieces would be fully equal to that of infantry and, occupying but little space, a very much larger number could be concentrated in a small area than would be possible with ordinary field pieces. These mortars could be most advantageously used, in large numbers, as an arm of reserve to be directed in a concentrated fire, to prepare the way for attack at critical points and times of a battle.

With an attainable range of at least 3000 yards a wide range is open for the selection of favorable positions. These may in many instances be entirely sheltered from the enemy's view and fire. From the curved character of the fire they might continue their fire for a considerable portion of the advance of attacking troops.

To attain decisive results this arm of reserve should consist of no less than 500 pieces. The small number of animals and men required for each piece would not render this large number a burdensome drain upon the force available for the general fighting purposes. It would enable the commanding general to deliver a concentrated, crushing fire, hardly attainable by the use of the fire of the regular field artillery. It is recognized that the directing of the fire of field mortars in large numbers presents problems not yet worked out practically, but it does not appear that their solution is unattainable.

The greatest difficulties will of course present themselves in indirect firing.

It would be a matter of both interest and importance to develop this arm of the service. Most of the work done in this direction has been entirely tentative and only on the proving ground.

Sixteen or twenty of the 3.6-in. field mortars are now making by the Ordnance Department of the army. It would be well if these were formed as a unit battery, equipped as suggested for field service, and developed by practical experience both in question of its transportation and mobility, and fire practice and tactics.

III.

"Power of Military Courts to Punish for Contempt."

Lieut. Wm. E. Birkhimer, Adjutant 3d U. S. Art'y.

IF courts-martial in our service have this power, they must derive it from one of two sources—(1) from statute, or (2) from common law.

It is scarcely contended that the statutory power exists. At one time it did in our service, but it was taken away. Article 6, section 14 of the Articles of War adopted by the Revolutionary Congress in 1776 provided explicitly that "all persons called to give evidence in any cause before a court-martial, who shall refuse to give evidence, shall be punished for such refusal at the discretion of such court-martial." There can be no doubt about what was meant by this language. It meant just what it said. Cases of civilians having refused to testify had arisen before some of the courts-martial, and this provision was intended thereafter to make such refusals punishable.

It is evident, therefore, that the attention of the law-makers had been pointedly directed to this fault in the coercive power of military courts. Nor is this the only instance of it. In the Act approved April 18, 1814, for calling forth the militia (section 4), it is provided that "if any witness, when called upon for that purpose [*i. e.*, to give evidence before a court-martial for the trial of militia] shall refuse to testify * * * it shall be lawful for said court to punish every said offender by imprisonment for a term not exceeding one month, at the discretion of the court."

After these provisions of law, under both the Revolutionary and Constitutional forms of our government, it will not be claimed that either the attention of Congress has not been sufficiently called to the matter under discussion, or that, when the law-making power has seen fit to do so, it has failed to remedy the evil complained of, to the extent that the Legislature deemed necessary.

But this is not the only evidence we have that Congress has deliberately considered this matter. On May 31, 1786, the Articles of War, in so far as they related to the administration of justice in the Army, were revised. Section 14 of the Articles of 1776 before mentioned was repealed, and in its stead 27 new articles were enacted applicable to court-martial and other kindred duty. From these latter articles the power of courts-martial to punish civilians for refusing to testify was omitted. This was not accidental. It was intended to be so. And, Congress having at one time, and after its attention had been drawn to the apparent necessity of the measure, authorized courts-martial to punish civilians who refused to testify when brought before them, the omission of such authority in these revised articles touching court-martial matters specially, is most significant, and clearly indicates the intention of the legislature to deprive them of that power. This act was passed under the government of the Confederation. The authority to punish civilians for refusing to testify before courts-martial has never been renewed in the Articles of War. The Act of April 18, 1814, before mentioned, affecting the militia courts-martial, expired at the end of the War with Great Britain. And, if there should be any doubt on the subject, it may be stated here that the words "all persons" in the Articles of 1776 were interpreted at the time to include civilians, some of whom were punished by courts-martial for this contempt, which action of the courts received the approbation of Congress.

The 86th Article of War is generally conceded not to touch the subject under discussion. It authorizes courts-martial to punish at discretion any person who uses any menacing words, signs or gestures in its presence, or who disturbs its proceedings by riot or disorder. We copied this provision bodily from the English Articles of War in 1775, and have kept it ever since. It was in our Articles of War when they also in-

cluded the power of punishing civilians for refusing to testify and it has remained in them after the latter power was dropped out. This could not have been the result of accident, but of legislative design.

Reference has been made to the English articles, whence our own were drawn. And there is no better way to arrive at a just conclusion regarding what our own articles mean than to examine the practice of that country relative to others. We find that in England courts-martial labored under the same difficulties that ours do now when civilian witnesses refused to give evidence. "It has been again and again decided" said Sir James Mansfield, "that though acts of Parliament give power to courts-martial to compel the attendance of witnesses, yet, when they do attend, the court cannot compel them to speak, or commit them for contempt."* This defect was cured in 1830, by 2 George IV. D. 7.† By this act witnesses who refused to be sworn, or being sworn, to give evidence, or to answer all such questions as the court might legally demand of them, were rendered liable to attachment in the superior courts. This has continued to be the law.

By the British Army Act of 1881, which incorporated into a law the then existing mutiny act, articles of war and rules of procedure (the two latter originating with the crown), this matter was particularly alluded to. By section 126 it is provided that where any person who is not subject to military law refuses to answer any question to which a court-martial may legally require an answer, the President of the court-martial may certify the offense of such person under his hand to any court of law in the part of her Majesty's dominions where the offense is committed which has power to punish witnesses if guilty of like offenses in that court, and the court may inquire into such alleged offense and if found substantiated may punish the recalcitrant witness in like manner as if he had committed the contempt in that court.

Such is the state of the English law; and it leaves nothing to be desired perhaps in the way of enabling courts-martial to uphold their dignity in this particular. But it will not escape notice that this satisfactory state of the law was not arrived at by inferences drawn from a course of reasoning regarding what the imperfect law ought to be to be efficient; nothing but a positive statute saying specifically that civilians who refused to testify should be punished therefor, and pointing out the method of doing this, sufficed to render them liable. This conforms to our practice, under Resolution of Congress, from 1776 to 1786.

Section 1202 Revised Statutes gives the Judge Advocate of a court-martial power to issue the like process to compel witnesses to appear and testify which courts of criminal jurisdiction within the state, territory or district where such military court shall be ordered to sit, may lawfully issue.

Now it may be that Congress did intend by this act to give the court the machinery not only to bring the witness before it, but compel him to testify in response to all proper questions. The words "and testify" give color to such supposition. And it is true that we should strive to give the words of the statute their proper meaning, as intended by the law makers, when we are construing it. Nor are we to assume that the law does a vain thing.

On the other hand we are not to make law by construction. We may not help the law makers out in this respect. If they have used language which fails to meet the object they have in view, it is their fault, not ours, and we are not at liberty to make the law for them. Now, the only power given in section 1202 referred to, is that of issuing "process" for a certain purpose. Will it be maintained that punishing for contempt is a "process"? It is the very essence of summary procedure. When the

* McArthur, C. M., vol. 2, p. 109.

† IV. sec. of Mutiny Act (see Clode Mil. and Mar. Law, p. 126).

subpœna issues and attendance is enforced conformably with its mandate, the "process" is at an end. If the law makers intended by section 1202 to confer the power of punishing civilians who refused to testify, the language they used to express that intention was inadequate for the purpose. We are not permitted by the potent power of construction to help them out.

It is true that this leads to embarrassing consequences sometimes. The remedy is to change the law as contemplated by the bill now before Congress for that purpose. When this inconvenience was experienced before we mended matters by making civilians punishable, we abandoned that very proper measure for reasons which we must suppose were good and sufficient for the law makers, and now we are about, it is hoped, after the lapse of a century, going back to the virtuous practices of the Fathers.

Courts-martial are tribunals of very limited jurisdiction. It is a well-established principle that the law intends nothing in their favor. When their jurisdiction is questioned in a court of law it must be shown, affirmatively, that they have jurisdiction. The whole tendency of judicial bias and decision in both England and the United States is to withdraw members of the civil community, except with armies, in the field, from military cognizance. A court-martial is not, therefore, the tribunal to draw favorable inferences from uncertain premises regarding its jurisdiction over civilians. The "custom of war in like cases" alone would justify this. No set of public officials are better aware of this than the members of courts-martial themselves. As a result they very wisely decline to run the risk of entangling themselves in the meshes of the law by assuming any doubtful power of punishment over civilians in contempt.

This subject is not new. So long ago as 1880 the Judge Advocate General of the Army gave it as his opinion that a court-martial would not be authorized to punish, as for contempt, under the 86th article or otherwise, a civilian witness who declined, without disorder, to testify. The present Acting Judge Advocate General held to the same view when section 1202 was under consideration, and in this opinion he was upheld both by Judge Endicott, the Secretary of War, and the Attorney General.

It certainly would be an anomaly, the greatest absurdity even, if civilian witnesses could be punished for refusing to testify before a commission issued at the instance of a court-martial, and yet not be punishable for contempt in refusing to testify before the court itself. But we are relieved from all apprehension that such absurdity will arise. This conclusion cannot be reached, because the premises are faulty. There is no authority in law for issuing a commission for the taking of depositions to be used as evidence before courts-martial. The provision of the statutes relating to depositions under a *dedimus potestatem*, and in *perpetuam rei memoriam*, etc. (sections 867-869 Revised Statutes), apply only to the Civil Judiciary. It has been decided that courts-martial constitute no part of the Judiciary of the United States.

One word with regard to the alleged absolute character of our present articles of war, sometimes dwelt upon by speculative writers. In some respects they may be obnoxious to this criticism. But they are not for the governance of lawyers. They constitute the rule of conduct for a body of men who have consecrated their lives to the profession of arms. The camp is their fittest field of application. They may appear very objectionable in some respects, contemplated from a purely legal standpoint, and yet be admirably adapted to their purpose of uniting, governing, and directing to a single object, the armed force of the nation. The Army has existed under this code with slight modification for upwards of a century—it has known no other. The soldiers of the Republic want no other. Whatever of credit for itself or glory for the country the Army has won, it has been under the discipline inculcated by these Articles of War or upon the negotiations based upon and in unison with them. They may not be perfect, but changes in them should be very carefully made.

Reprints and Translations.*

DISCIPLINE AND HUMANITY.

By CAPTAIN VON REICHENAU, German Artillery.

Translated by Lieut. Alfred S. Frost, 25th U. S. Infantry.

(*By permission.*)

WE live in a time which will in all probability be hereafter referred to as the happy turning point in the pathway of social progress and development. There is, therefore, an especial interest in following the gradual change of opinions in the different departments of thought. Such a change seems partly to have come, partly to be coming, with respect to humanitarian agitations. I do not mean by this the truly humane thoughts and actions designed to promote the well-being of society, but rather those agitations, arising from a false understanding of human rights and the dignity of man, which seize upon all severe, degrading and unworthy treatment of individuals or of whole classes, in the belief that they must be combatted.

Especially in the punishments of crimes and misdemeanors does our friend of humanity of the class mentioned, demand a so-called humane treatment of the offender undergoing sentence, and therefore the tendency is always towards lessening and ameliorating the punishment and towards the moral elevation of the criminal.

Another class, revived of late, opposes this current and has forced itself into notice. This class favors the employment of unrestricted force and energy, coupled however with absolute justice, in the management of those who have disturbed or prejudiced the well-being of society, or a part thereof, by their conduct.

It goes without saying that according as the one or the other of these views is adopted the conclusions arrived at concerning the condition and behavior of human society, especially that portion of it which dares to overstep the laws, will be very different. It is, therefore, important to obtain the clearest possible understanding of the influence upon society of humanitarian agitations as well as of the energetic execution of the legal code of punishments.

And what he who follows these different methods finds to be the sum total of results, applies in a far more intense degree to the Army which

* Please address communications concerning reprints, translations and reviews to Lieut. J. C. Bush, editor of this department.

can only aim at and develop the greatest possible strength by following a definite form in governing all military persons, *i. e.*, by unconditional subordination to the given orders and regulations.

It is accordingly of the highest value to know—and certainly in our times it is of interest to ascertain anew—in what manner such a system can be most safely established, and particularly in how far the one or the other of the beforementioned principles: those of humanity or those of—I might say—the objective force shall be followed.

I will preface my treatise by saying that in these investigations a wider range than at first intended was unavoidable, for, in the deduction of principles claiming a general value appearances in their universality must be kept in view. If, therefore, my essay appears wide of the mark in several places, I beg the reader leniently to consider whether the principles developed by the general inquiry do not finally include the only possibility for the certain solution of the particular problem before us.

* * * * * * *

If the artist, the technicist, the artisan, would work upon any material whatsoever, if they would change and mould it, it is absolutely necessary that they first possess an accurate knowledge of the given material and how it will behave during the various processes it must undergo. This preliminary requirement is so well understood that it would be thought foolish and absurd if any one, for instance, should undertake to make a gun of cast-steel without a thorough understanding of the properties of that metal, its resistance, its elasticity, its behavior under the decomposing influence and tension of the powder gases. Not less absurd would it appear were the iron-worker to maintain that because he has learned to work in iron, he can work just as well in wood. This assertion would appear foolish to us because we believe it to be so generally understood and so indispensable that whoever desires to work with a given material must first acquire a knowledge of its nature.

Experience shows that in the case of a single object only does mankind depart from this view and that object is—man.

Why, when it comes to man, so far as, by education, training and employment he can be regarded as a material, does a comprehensive knowledge not always obtain, or rather is not held necessary to those who employ this material? is so profound a question that its elucidation will not be undertaken here. But, as with other materials, so, it must be admitted, in working upon men, one can only expect the wished-for result when he can render an account to himself of how each of the means employed will and must work.

That this knowledge can be acquired is not to be doubted when one considers that all the spiritual and physical antecedents of mankind were governed by laws as firmly established and immutable as are all the laws of nature.

If one possesses a knowledge of the spiritual constitution of man and knows how different hopes, fears and actions influence him, he can, with an accuracy corresponding to that of science, calculate the results which follow these different influences.

As the proper treatment of whatever material is to be worked upon requires an accurate knowledge of its properties at the outset, so also the management of men, if it is to be properly done, must be based upon a correct understanding of their nature.

Therefore before we can determine whether this or that method of handling men will give better results, we must inquire into the qualities of man, and the effect of the means employed as discipline.

* * * * * * *

We seek to discipline the soldier by instruction, punishment, reward, practice, and by awakening the feeling of patriotism.

It is, therefore, to be determined what results can be expected from the employment of these means singly and collectively.

Before we approach nearer to the subject of instruction it is necessary to grasp the idea precisely and, before all, to sharply distinguish between instruction and education. While instruction only includes growth of knowledge and strengthening of the understanding, education embraces besides these, the influencing of character and disposition. This distinction is in general not properly observed, which shows that those to whom instruction and education are identical believe that they can better man's condition and lift him to a high plane by instruction alone. In order to support their position they, among other things, cite as proof that among the inmates of prisons those who have but a slight knowledge of reading and writing or none at all, and those who have been little benefitted by instruction, form a disproportionately large percentage of the whole. This statistical fact is undoubtedly correct, although from it the conclusion referred to is drawn, and this only proves anew with what caution one must use statistics if he would avoid falling into great and dangerous errors. The weak grounds upon which this conclusion rests are clearly shown by the fact that in inspecting the inmates of a prison it would be found that a great majority might be used in support of the theory that their criminality was owing to the infrequency of bathing and of changing the clothes, to living in backstreets and by-ways instead of on the avenue, to eating black-bread instead of cake, to drinking beer instead of wine, etc., and with the same show of justice.

Further, the injustice of the theory advanced in regard to instruction is shown by the circumstance that by no means all or even the greater part of those who have received thorough instruction follow a moral calling.

For instance, it is impossible to maintain that deceitful promoters and bankrupts, dishonest revenue officers, blacklegs and tradesmen who adulterate their goods, are men who have lacked instruction, but on the contrary, it must be admitted that among criminals of this sort the majority are intelligent and that many require a high degre of scientific knowledge to carry on their iniquities, a quality again which protects them from discovery and also from sentence to imprisonment.

From this we see that the belief in the moral influence of instruction has no unrestricted justification. What ingenious connection is there between mathematical knowledge and good faith; between geographical knowledge and the sentiment of justice; between the art of writing and the wish to do

good; between perfection in reading and respect for the law? There is certainly no direct relationship, and even if an indirect relationship could be shown to exist between knowledge and the majority of these virtues it would not help us any.

Turning to the training of the soldier in disciplined behavior, it must be admitted that the wish and the will are not brought into obedience by knowledge alone, otherwise we would not meet so frequently with intelligence and unreliability, nor, on the other hand, with ignorance combined with loyalty and bravery.

To this it may be replied that while it is true that instruction in common scientific knowledge may fail in this respect, yet an instruction specially adapted to the desired object united to the inculcation of the principles of morality, would succeed in causing moral conduct among the learned.

But even against this assumption experience speaks in numerous daily instances. Indeed, when the first lessons of practical morality are given, in the training of the young, they are in no way helped by this instruction. How often parents and teachers complain that constant inculcation of the good and censure of the bad does not suffice, and how many times it happens that just those children who have received the most unexceptional instruction and exhortation are the ones that least fulfil expectations, and, in truth, the only ones. When we look closer into the home-life do we find servants behaving better towards the one giving them instruction specially designed for the desired object? Do they not commonly pay little heed to the best meant exhortations and always fall back into their perverse habits in spite of the clearest proofs of their absurdity?

As we have already dared to draw the conclusion that general knowledge stands in no immediate relationship to discipline, we will now conclude further that even instruction deliberately designed for the purpose will not alone attain the desired end. It is an error to believe that we can discipline the men by explaining yet a hundred times, rules and regulations already explained ten times and not followed.

Although we here show the value of instruction to be much smaller than generally supposed, yet instruction cannot be dispensed with in the training for discipline. The degree in which it should be used is first determined after the influence upon the men of the other means at hand has been ascertained.

Supported by the highest authorities I dare express the conviction that all our actions are based upon our emotions which again are aroused by ideas and events. In proof of this I cite a passage from Herbert Spencer's excellent work, "Introduction to the Study of Sociology." He says, in the chapter entitled "Preparation in Psychology":

"If I tread on a pin, or, unawares dip my hand into very hot water, I start; the strong sensation produces motion without any thought intervening. Conversely, the proposition that a pin pricks, or that hot water scalds, leaves me quite unmoved. True, if to one of these propositions is joined the idea that a pin is about to pierce my skin, or to the other the idea that some hot water will fall on it, there results a tendency, more or less decided, to shrink. But that which causes shrinking is the ideal pain.

"The statement that the pin will hurt or the water scald produces no effect so long as there is nothing beyond a recognition of its meaning; it produces an effect only when the pain verbally asserted, becomes a pain actually conceived as impending, only when there rises in consciousness a representation of the pain, which is a faint form of the pain as before felt. That is to say, the cause of movement here as in other cases is a feeling and not a cognition. What we see even in these simplest actions, runs through actions of all degrees of complexity. It is never the knowledge which is the moving agent in conduct; but it is always the feeling which goes along with that knowledge or is excited by it. Though the drunkard knows that after to-day's debauch will come to-morrow's headache, yet he is not deterred by consciousness of this truth, unless the penalty is distinctly represented, unless there arises in his consciousness a vivid idea of the misery to be borne, unless there is excited in him an adequate amount of feeling antagonistic to his desire for drink. Similarly with improvidence in general. If coming evils are imagined with clearness and the threatened sufferings ideally felt, there is a due check on the tendency to take immediate gratification without stint; but in the absence of that consciousness of future ills which is constituted by ideas of pain distinct or vague, the passing desire is not opposed effectually. The truth that recklessness brings distress, fully acknowledged though it be, remains inoperative. The mere cognition does not affect conduct—conduct is affected only when the cognition passes out of that intellectual form in which the idea of distress is little more than verbal, into a form in which this term of the proposition is developed into a vivid imagination of distress—a mass of painful feeling. It is thus with conduct of every kind. See this group of persons clustered at the river side. A boat has upset and some one is in danger of drowning. The fact that in the absence of aid the youth in the water will shortly die is known to them all. That by swimming to his assistance his life may be saved, is a proposition denied by none of them. The duty of helping fellow creatures who are in difficulties, they have been taught all their lives; and they will severally admit that running a risk to prevent death is praiseworthy. Nevertheless, though sundry of them can swim, they do nothing beyond shouting for assistance or giving advice. But now comes one who, tearing off his coat, plunges in to the rescue. In what does he differ from the others? Not in knowledge. Their cognitions are equally clear with his. They know as well as he does that death is impending; and know, too, how it may be prevented. In him, however, these cognitions arouse certain corelative emotions more strongly than they are aroused in the rest. Groups of feelings are excited in all; but whereas in the others the deterrent feelings of fear, etc., preponderate, in him there is a surplus of the feelings excited by sympathy, joined, it may be, with others not of so high a kind. In each case, however, the behavior is not determined by knowledge but by emotion. Obviously, change in the actions of these passive spectators is not to be effected by making their cognitions clearer, but by making their higher feelings stronger."

After Spencer's masterly exposition of the given proposition it may be looked upon as proved; but there remains the question: what are those

ideas and actions which will arouse the feelings and which in themselves are powerful enough to lead to proper conduct? When this is ascertained we may safely inquire into the means, by the employment of which the maintenance of discipline is guaranteed.

Much as one, owing to the hateful and not altogether correct significance attached to the word egoism, may strive against the acknowledgment, it is nevertheless indisputable that only those conceptions arouse feelings of sufficient intensity to bring forth actions, which stand in a certain relationship to our wishes, hopes or fears. In order to prove this it is only necessary to be reminded of the influence which two events exactly similar exert upon us, the one concerning a person near to us and closely bound up in our own interest, the other some mishap befalling a stranger. When a person near to us dies we experience powerful feelings of sorrow and pain; but when we hear of the death of a stranger though under the very same circumstances, we think and perhaps say that it is very sad, but our feelings are either not disturbed at all or only in a slight degree which again increases in proportion as we are reminded of our own loss.

Similarly do we regard some great event befalling the public. As soon as a nation becomes involved in war it follows with intense interest the fortunes of its army; each victory is hailed with joy and enthusiasm, each defeat causes sorrow and dejection. When, however, foreign nations engage in sanguinary wars in which they battle for their most sacred interests, nay, even their very existence itself, we look upon the bulletins from the seat of war as interesting news merely, which we forget as quickly as we hear, provided the results of the war do not prejudice our own national or scientific interests.

If, in cases like the preceding, the connection between the feeling aroused and our personal interests is clear, there are other cases where this connection though none the less present, lies less upon the surface. For example, it frequently happens that a person hearing of the misfortunes of one until then an entire stranger, labors to the utmost to lessen his suffering, just as many individuals of a nation far removed from a war seek by their contributions to allay the sufferings of the sick and wounded soldiers.

Perhaps at first sight many will be disposed to maintain that there is no connection between the feeling of compassion and the personal interests; and that, therefore, the assertion above made is not universally true. But even in such cases there is a connection, though a very subtile one, between feelings and interests.

Benevolence rests either upon compassion, the feeling of duty, or delight in making others happy; or, finally, upon the desire for the good opinion of others.

The feeling of compassion is synonymous with the liveliest conception of the suffering of another; it is a partial sharing of the sensation of pain; and the wish to ameliorate the sorrows of the unfortunate includes within itself the wish to be freed from one's own painful impressions.

Let us now consider the benevolent actions arising from a sense of duty. Whoever, from whatsoever cause, esteems it his duty to lessen the sufferings of his neighbor as far as lies in his power, will, if he fails to perform a possi-

ble benevolence, be troubled with inner reproaches for his omission. While in the contrary case he will have the happy consciousness of duty performed. From this it follows that not only benevolences undertaken from a sense of duty but all deeds springing from that sense stand in the closest relationship with the feelings and interests of the actor.

And so wherever we may look in life we will always find, upon unbiassed observation, that our feelings and actions are alone caused by ideas and events which invariably stand in some sort of relationship to our own interests. Events which neither excite within us feelings of joy, of comfort or of hope, nor yet those of pain, sorrow or fear do not incite us to action; and we only act where hopes or fears for ourselves directly or indirectly enjoin us.

From the foregoing it follows that only rewards or the expectation of them, and punishments or the fear of them control our deeds and omissions. And in these are included not only the rewards and punishments coming from without but also those arising from the consciousness of having done right or wrong.

It is therefore true that all of our actions have their origin in the motives named and we may also remark, that man undertakes a great variety of actions without feeling clearly or thinking upon their consequence to himself. Such actions are called habits or customs. Habit, that powerful lever in inciting human activity, will be shown according to the individuality, by the more or less frequent repetition of some one act. In the beginning there underlies the given action, during a longer or shorter time, the above mentioned laws: *i. e.*, it will be first brought forth by hopes or fears; gradually, however, these feelings will retire more and more into the background, and, upon suggestion from without, the action will be executed unconsciously or, in common parlance, "without thinking."

To recapitulate, I must emphasize:

First. All actions are immediately suggested by corresponding feelings.

Second. Only those ideas and events which stand related to our own interests, either from hope of reward or fear of punishment, are productive of feelings of the strength necessary to provoke actions.

Third. Actions which have often been performed by a given person will be executed by him at an appropriate suggestion, frequently by pure force of habit, *i. e.*, without weighing the consequences to himself.

Having established these principles I return to the disciplining influence of instruction. We have seen that neither general instruction nor that aimed directly at the desired object succeeds in implanting morality among the learned, but that the feelings must first be aroused. Instruction will accomplish results only in the degree that it calls forth ideas which excite the emotions with sufficient power. Here the direct value of moral instruction, to which we have alluded, makes itself felt; for the abler, sharper and more penetrating mind more easily weighs the results of certain actions and thereby experiences a corresponding revulsion of feeling.

If, for example, the soldier comprehends the fact that discipline in the army is not alone a requirement full of benefits for the whole but also for the individual, he will, more than one who lacks this insight, strive to realize these beneficial results for himself by disciplined behavior.

It shows also that where instruction begins to bear fruit it has entered into an alliance with the feelings. It is, however, the union of knowledge and feeling which education, that final end of all training, accomplishes.

If therefore the mental attainments of all military persons were great enough to lead them to a proper appreciation of the above truth with respect to discipline, many, if not all, would be won by instruction. Not all, indeed, for the feeling called into being by instruction will only flourish so long as it is not suppressed by stronger feelings of another sort which on their part are paralyzed by the advent of still other emotions.

As the moral education of the rank and file neither is nor will be so great that instruction of the kind referred to can have the desired results, instruction must be considered, in the training in discipline, only as a means of acquainting the subordinate with the will of the superior. If, however, the execution of orders and regulations is to be assured, we must resort to other means, and in truth such as will operate upon the feelings with sufficient power to generate the required actions.

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The next means of working upon the feelings is punishment.

As was formerly pointed out men only refrain from committing bad and prohibited deeds from fear of the evil consequences which these deeds will sooner or later bring upon them; and, as already mentioned, these unfavorable results may consist in self-reproaches and the stings of conscience.

The measure of every punishment must be based upon this truth.

If, in the interests of society, it is deemed advisable to suppress some one action there must be annexed thereto a punishment so severe that the fear of it will exceed the inclination to commit the act. He upon whom the punishment falls must thereby be brought to the conclusion:

"The pain of the punishment exceeds by far the pleasure for the sake of which I brought the punishment upon me; I will, therefore, in future desist from similar pleasure for fear of being visited by similar punishment." In like manner will he think who hears of the execution of an adequately severe punishment and therein lies the object of the promulgation of sentences, the making known as far as possible of the punishments adjudged.

Too mild a punishment will not call forth the above reflection on the part of the offender nor will it fulfil the object of deterring others. If a soldier who has been dissipating eight whole days receives only day in arrest his conclusion will not be that given above, but as follows:

"For eight days' liberty I will willingly take one day's arrest, for such a pleasure one can afford to undergo a little hardship."

A punishment to fulfil its object must be of a preventive nature, and our entire criminal practice shows, though it is not always openly expressed, that as a matter of fact we view punishment as a preventive and not as an atonement or penance. An offense once committed, with its train of unhappy consequences, can never be recalled even though we visit the most severe penalties upon the offender; and if the object of punishment is not to prevent the future commission of such offenses, it must be quite purposeless and becomes a mere act of revenge whose blameworthiness increases with

its severity, and by means of which the pain caused the injured person is followed by the wanton infliction of more pain upon the offender.

Revenge is a feeling which doubtless rankles in the breast of the injured person, and may there have its proper place; but it must be unknown to the law and to its officers; for when revenge sits upon the bench, punishments are hard, unjust and inhuman.

Therefore it has long been a settled maxim in our army that justice is not to be disturbed by excited feelings; that not forthwith after taking notice of past crimes and misdemeanors, but only after mature deliberation, will sentence be pronounced.

If punishment is regarded as an expiation for past misdeeds—as penance—then it is synonymous with revenge, and on the other hand compassion, leniency and the wish to ameliorate punishment are nearly allied to it. For this reason those who have not kept account of these kindred feelings, are inclined to look upon the employment of a proper measure of punishment as inhuman. From this point of view humanity is understood to mean the treatment of all men, both the good and the bad in the gentlest and mildest manner possible. Indeed, in the friend of humanity we find one chief and laudable aim which is to comfort the unfortunate and improve their condition. When, however, one discovers in every criminal an unfortunate whose misery must be lessened, it is no longer praiseworthy because, though amelioration is caused on the one side, on the other it is increased a thousand fold. When punishment is used in the sense of the moral betterment of the law-breaker, which goes hand in hand with a mild and considerate treatment, it naturally follows that the crime is sooner imitated than if the criminal had suffered an effective, *i. e.*, an exemplary punishment. When we aim at the greatest possible moral improvement of an offender, the criminal following his example feels quite undisturbed, for if discovered he knows he will be treated with kindness and consideration, and will also be improved. From this it is clear that those who permit themselves to treat criminals according to the perverted idea of humanity above indicated, are guilty of inhumanity towards the great body of society, *i. e.*, towards all honest men. For the more humanity, *i. e.*, the more kindness, in the treatment of the guilty the less protection afforded against crime, and as the honest man is exposed to violence from the criminal the inhumanity towards the first is culpable. Therefore we are justified in saying: Humanity towards criminals is inhumanity towards the better part of the people, and as a further consequence towards all the well-intentioned in society.

This principle can be directly applied to the army, for too great leniency in governing the disciplined soldier will soon produce a state fatal to all, and, in the end, a hundred brave soldiers will suffer if a bad one is dealt with too leniently.

The recognition and application of the above principles is far removed from any cruelty when we make our punishments no more severe than necessary for the object in view. Only the overstepping of these bounds can truly be classed as inhuman, as superfluous suffering.

Viewing punishment as a means of prevention, it follows that the sever-

est penalty must be attached to those offenses which most threaten the dearest interests of society, and further, to those human-nature is most prone to commit. It would be unjust to punish offenses known to be prejudicial to the common welfare more mildy because of a special tendency in man's nature towards their commission. By the adoption of this policy the only reasonable object of punishment—the prevention of future offenses—will only be imperfectly attained; for thus there would be the smallest proportional effort to avert what has the greatest probability of occurring.

In the measure of punishment three points should be considered:

1st. The greatness of the injury following, or that might follow, upon the crime.

2d. The greater or less probability of a repetition of the offense as shown by the motive found.

3d. How far the previous experience of the offender enabled him to appreciate the injury his offense might cause society.

The necessity for such consideration becomes apparent when it is remembered that to those who have received the injury it does not matter what the underlying cause may be. The injury is just as great when somebody is hit by a carelessly thrown stone, as if it was thrown designedly; again it is quite indifferent to the victim whether the house was set on fire from carelessness or revenge; further, it is undoubtedly true that two deaths or fires from carelessness may cause more suffering than one murder or one incendiary fire, though the circumstances are similar.

On the ground of public policy it is therefore justifiable to punish him who injures his fellows through carelessness, and as is well known our criminal laws contemplate this also. A milder punishment of the offenses due to carelessness is only justified when they are less frequent than those premeditated. For example, if in a city a greater number of men are injured as the result of carelessness than from intention, the interest of the public demands that careless acts be punished as severely as those intended.

By carelessness is understood such neglect of all proper rules of caution as experience has shown may easily result in misfortune. If, however, an accident is caused by conduct which from previous experience seemed perfectly harmless, the offender cannot be punished. Such punishment would fail of its object, namely, prevention.

From this we see how necessary it is to seek the motive of the misdemeanor or crime that it may be a factor in the measure of punishment in the degree that it shows the danger to society of the given criminal. If the behavior of the offender shows that he disregarded public sentiment and overstepped the laws with ease and brutality, society is interested that such a man be made harmless for a longer period than one committing the same offense but whose character includes less dangerous qualities. In the case of the individual as well as of society at large, the instinct of self-preservation has a tendency to shield one's self as much as possible from those things which can cause the greatest harm, and, pursuant to that instinct, it is of the first importance to build up a national system of punishments.

It is the law of self-preservation which leads us to punish all those actions which though harmless in themselves might lead to fatal consequences. For

this reason we punish sleeping on post in the presence of the enemy with death, even in those cases from which no sort of prejudice has resulted. By this measure we seek to prevent the evils which might follow from sleeping on post. These cases afford a convincing proof of the preventive character of punishments.

When we apply this to army discipline it follows that offenses against discipline must in general be severely punished for the reason that the maintenance of discipline is of the highest importance to the very existence of the army, and because, further, it is the tendency of human nature to rebel against a strict observance of the regulations.

The necessity for a severe punishment of insubordination, at which we have hinted, serves to show how indispensable is the special and independent jurisdiction of courts-martial. If insubordination in the army were to be punished after the principles of the civil law, either military offenders would be punished too lightly or civilians too severely. For considerations of discipline the same offense in the army and out of it must be regarded from very different standpoints, for in the army it frequently occurs that an act must be punished with severity which in civil life would be quite removed from the cognizance of a court.

As the point here referred to is perfectly clear, it is generally admitted even by those opposing a separate military jurisdiction that the punishment of insubordination must be the peculiar province of a military court but, they maintain, all common crimes and misdemeanors should be punished according to the principles of the common law. This must also rest upon a true perception of the case or a knowledge of the proper object of punishment. Whoever, for example, would punish a soldier who steals from his comrades and purloins from stores placed under his charge, according to the principles of the civil criminal code would show an utter ignorance of the far greater importance attached to the suppression of such practices in the army than is the case in civil life, and therefore the military offender should be more severely punished than the civilian.

To be sure there are isolated crimes and misdemeanors committed by military persons which may be punished according to the civil code, but for that reason it would not be rational to require that all crimes by military persons should be punished according to the provisions of the civil law. It is only just, however, to bring the punishments of the military code into agreement with those of the civil code in analogous cases; for the rest, give to each injurious offense the punishment necessary for the suppression of that particular offense in the army.

After this general review of the principles according to which punishments should be administered, the question arises, what punishments are to be administered and in what degree? To this it must be replied that there are no forms definitely fixed for all time.

In every legal proceeding the punishment to be applied must rather be left to experience; that alone will show us what manner and degree of punishment should be employed to attain the desired end. If, for instance, it is necessary to apply the same punishment to the same individual with great frequency, it may be maintained that the punishment was either too

severe or too slight in degree. In the attempt to give the punishment the power of deterring others, one must not go to the extent of useless cruelty, for it must always be borne in mind that even the severest punishments are unable to check all criminality, for in the moment of passion man can only be restrained from following the bent of his aroused feelings by a power which works upon him directly.

Passion is blind and does not see beyond the next moment; if one, therefore, will lessen the offenses committed in consequence of passion, he can only lessen or prevent the causes giving rise to passion. Thus, the excesses arising from drunkenness can only be diminished by working upon drunkenness itself, and the penalties attached to these excesses are only effective in so far as they cause the offender to avoid causes which can become so dangerous to him.

The ideal execution of the theory of punishment as a means of prevention would require as many different punishments for the same offense as there are differences in the natures of men; for upon men of different degrees of sensitiveness the same punishment will operate in a different manner, for instance, in the case of a sensitive nature the same result can be obtained by a light punishment as would be effected by a severe punishment upon a coarse nature.

If these principles find no expression in the regulations concerning punishment it is explained by two reasons. First, it is impossible to punish men according to their individuality. Second, if it were possible, it would shock the sense of justice to an inadmissible degree.

This impossibility is owing to the many-sidedness of human nature and what theoretically would be regarded as the highest degree of human justice would in practice find discredit in the eyes of all. No one would admit that on account of his mental endowments he should be punished more severely for the same offense than another, and all receiving the severer punishment would complain of the great injustice done them.

The criminal code which issues from one place and is intended for all contemplates this. But it is otherwise where the punishment is administered by those who are thoroughly familiar with the character and temperament of the offender as is commonly the case in the army. Here, with a proper degree of caution, the same offense is variously treated; especially where it may be suppressed by a lighter punishment; proper attention, however, must always be paid to the principle that the sense of justice of the other soldiers must not be shocked, a requirement which can commonly be fulfilled by a few words of instruction from the company commander.

The principle that punishment should prevent a recurrence of the offense and, as has been laid down, should be proportioned to the danger of its commission and to the inclination thereto, explains why punishments have been so very different in different periods of civilization and among different nations.

If in the army we have abolished the severe punishments of running the gauntlet, caning, binding in constrained attitudes, etc., we have not done it from considerations of humanity, but in consequence of the growth with civilization of greater sensitiveness to punishment. Rougher customs and

less mental cultivation make men less sensitive to hardship. The punishment of arrest, scarcely felt by the ignorant man accustomed to privations, can become torture to one accustomed to luxury and mental activity.

Now, as has been said, with the growth of civilization sensitiveness becomes so much more general that the true interests of humanity demand that the penal code be revised from time to time and correspondingly changed. And the true function of humanity must be considered to be the avoidance of severer punishment than its object, the lessening of misdemeanors and crimes, demands; it must not, however, out of compassion for the poor criminal or a false estimate of the "dignity of man," seek to render the punishment nugatory in the case of criminals and the like. For instance, if the object can be reached without the use of the whip it would be cruel and shameful to employ it, but as soon as it becomes apparent that its use is desirable and necessary it would be false humanity to withhold it.

It is possible that the conclusions deduced from the foregoing discussion will arouse not a little horror in those circles which have labored of late to raise the standard of a mistaken humanity, and with whom it is an avowed principle that the whip is above all inadmissible because like every corporal punishment it dishonors and degrades.

However correct these views may be in the majority of concrete cases, they must be actively opposed when it is sought to raise them to a principle. Still it cannot be required that all men should be treated alike, for equal justice to all is not identical with equal treatment for all. Equal justice only requires like treatment of those numbered in the same category, but why, in this category, those, who in the whole course of their lives have shown themselves to be without honor, should be treated with the same regard for human dignity as is shown towards those who are sentenced for a single error, is not clearly perceived. Dignity and honor can only be wounded where they are to be found. And it is further to be considered that corporal punishments in general are really not to be distinguished from some of the punishments now in vogue, such as, for instance, long confinement without a bed which causes not only bodily discomfort but even violent pain. The whip causes physicial pain, but only in a drastic manner.

But be this as it may, so much seems to me to be established in every case, that a reasonable punishment serves as the only means of attaining the true end we have so often pointed out. Human society cannot stand if it does not set its face against offenses which prejudice its true interests, and an army cannot grow strong if it does not weed out the disobedient. These are necessary conditions, they must be fulfilled, and if light punishments do not deter the lawbreakers harder ones must be resorted to. This is essential to the execution of a comprehensive scheme.

Opposed to the tendency of those seeking to uphold the mild principles referred to, there are arguments at hand in support of the principles for the adaptation of the code of punishments to the maintenance of discipline as here developed.

A writer in the Austro-Hungarian military journal *Vedette*, August 31, 1879, in an article entitled, "Our Army Discipline," remarks in his introduction:

"Complaints are frequently made of the lack of discipline in the army

and they are in a measure justified. This, however, is brought into the army from civil life. The time of service is too short and the military punishments not drastic enough for a great part of the yearly levies; the laws concerning discipline and punishment are too mildly administered to root out of the army this evil which has its origin in the people."

In the further course of this article the writer seeks to prove that a great part of the material composing the rank and file can only be disciplined by the use of the whip as their surroundings and experiences in civil life have led them to regard a mild punishment as a sign of weakness. He then favors the reintroduction of corporal punishment. In this connection the article continues:

"Again the use of corporal punishments in the field is in accordance with common sense, because as one readily sees, arrests and confinements in their varying degrees of severity are not practicable in time of war and one recoils from punishing offenses, which could be sufficiently atoned for on a part of the body, with Draconic severity,—with death,—while a hard bed, bread and water diet, deprivation of tobacco and the like are punishments that cannot well be administered in the field because frequently the entire army is forced to endure these hardships. But no hyper-humanitarianism! Men whose liberality and humanity are generally recognized have lately declared that only by more severity in the judgment of offenses and in the administration of punishments as well as the official reintroduction of corporal punishments in the field, and even in time of peace for a certain class of offenders, can the army be freed from evils whose consequences cannot be foreseen.

"We can assure ourselves that soldiers who are now punished by being bound (and in fact too lightly) do not lose the sense of honor nor does it become dwarfed, for the infliction of this punishment presupposes the absence of such qualities."

That the views contained in the article quoted cannot be considered as those generally held in the Austrian army is shown by another article which appeared in the same journal October 8, 1879 ("Our Army Discipline. Andiatur et altera pars"), in which the writer seeks to prove that the arguments in the first-named article are wholly false. In a more lengthy discussion he labors to show that not only punishment but in a pronounced degree the moral factors must be employed in training the rank and file in discipline, and that the feeling of honor in particular must be strengthened. At the same time this author is unable to free himself from the feeling that the punishments now employed need at times to be increased. This is brought out as follows:

"In looking upon the general behavior of our soldiers to-day we find no motive strong enough to lead us to advocate the reintroduction of corporal punishment. If, however, corporal punishment should ever be prescribed, in the isolated cases of stolid individuals, it must never be applied by the troops themselves. Whoever cannot be improved with the troops should be stripped of his honorable clothing in front of the troops, dressed in a laborer's smock and sent to a reform company* where corporal punish-

*Strafcompagnie.

ment may be administered. But, even this reformatory discipline must be imbued with the humane spirit of our century and above all must seek for the improvement of the individual. Such culprits, as in the course of a given time give promise of improvement, should be restored to honor and returned to their companies; such as show no improvement and are deemed utterly unworthy of the military service should be wholly removed from the ranks of the army. But to attain the object dishonorable discharge must be attended with consequences following the culprit into civil life in order to make it an effective warning. The transfer to the reform company as well as the dismissal from the service must be preceded by a warning."

I have quoted the foregoing arguments not to show that I am a partisan for or against the introduction of whipping, but only to show that there now exists a sentiment in favor of more drastic punishments than are applied at present.

To prevent misunderstanding, it here devolves upon me to expressly say—as above in regard to the attainment of salutary conditions so particularly in the attainment of discipline—that the remedy can by no means be sought in the employment of many and severe punishments alone, as will be shown in my arguments later on. On the contrary, I consider it in the highest degree desirable to restrict punishments within the narrowest allowable limits, but where it can no longer be avoided it must be applied effectively and therein lies the necessity of resorting even to the whip when other punishments cease to be efficacious. The punishment must subdue the inclination of the punished to continue in the evil ways which led to said punishment. Punishment must deter without, however, becoming uselessly hard, cruel and inhuman.

Before closing my discussion of punishment, I must once more touch upon a point which in modern times is often given the leading place, namely the improvement of the convict.

It certainly cannot be denied that he who seeks to improve those who have been betrayed into evil ways, acts according to the noblest sentiments of humanity, and in the true interests of society; but the question is, in what manner must this improvement be sought and particularly whether it can be usefully attempted during the period of punishment. Viewing the punishment as a preventive, the uniting of attempts at improvement with the infliction of the punishment must be without results in every case where these attempts so far ameliorate the punishment that it no longer deters. Improvement can only be combined with the infliction of punishment so far as the punishment itself in various ways leads to improvement; first, where it prevents by fear a repetition of the offense punished, and again, where it causes a healthful self-examination, which, as is well recognized, is more effective by far than all teaching from without. Further attempts at improvement are to be made in the time preceding or following the infliction of the punishment, and are not especially to be considered in an inquiry into punishment.

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The second means of discipline working upon the emotions is found in rewards.

As punishments are founded upon the fear entertained for the evil consequences of a forbidden action, so rewards are founded upon the feeling of hope which spurs us on to right actions by the growing desire for ideal or material advantages.

Rewards, although they are the exact contrary of punishments, should nevertheless accomplish the self-same results; *i. e.*, they should lead to those actions which are considered necessary and desirable.

It is the object of the threatened punishment to deter from the commission of prohibited acts, and it therefore indirectly aims at right conduct. The promised reward inspires good conduct and directly promotes it while indirectly suppressing the bad. Although the final object of rewards and punishments is the same, it will be seen that this object will only be perfectly attained when they support each other.

Just as in every department of human activity, rewards call forth that delight in performance so much to be desired, so in discipline, it is of even higher importance to use them to the greatest extent possible. The greater the reward, the greater the desire to possess it, and therefore the struggle to obtain it.

The rewards and favors which may be employed as a means of discipline, are, praise, lightening the duties, furloughs, good conduct certificates, promotion, and in the case of senior non-commissioned officers, decorations, etc.

To make certain that rewards will have the desired effect, they must be awarded with the same absolute justice as are punishments. As surely as punishment follows the discovery of an offense, so surely should rewards follow good conduct or any known act of distinction.

When I speak of rewards for good conduct, I must not be interpreted to mean that special rewards must be given for the simplest fulfilment of duty; but great care should be taken that men who do their duty are not deprived of favors which might have been bestowed by their superiors. The greater rewards are naturally only justified by some preëminent deed.

Even men who have undergone punishment should, in case of later good conduct, be rewarded though of course in a lesser degree than those who have never been punished. To withhold all rewards from them would not only be an intensifying of the punishment already suffered, but would hardly strengthen the inclination to continue the good behaviour recently commenced.

In this connection there is a wide field opened to the humanitarian impulse, for a just distribution of rewards will not only create a great amount of happiness and joy, but in consequence of the reciprocal action between rewards and punishments, through the employment of the former the latter will become unnecessary. Humanity is properly employed towards well-behaved men; to neglect it here would perhaps be a still greater mistake than to apply it, in the usual way, where in dealing with wickedness and crime it is sought to suppress actions of general injury. Let the obedient soldier receive his reward, and the disobedient be visited with unfailing punishment.

* * * * * * *

If I now pass to the fourth means of discipline, certainly not less impor-

tant than the three previously named and in any case indispensable, the practice in obedience, it is because *obedience from habit* takes the first place after instruction, fear and hope have exerted their influence.

It will be remembered that between feeling and action there is a subtile connection, and therefore that by means of frequent passages from certain feelings to certain actions the inclination to the latter is more and more strengthened. If one subjects the persons to be disciplined to those exercises in which they are continually forced to execute with punctuality certain definitely given orders, he can expect that, according to the individuality, after a longer or shorter time, the obedience at first given from the dictates of hope or fear, will be obtained later on from force of habit.

Such a result must be viewed as highly desirable, even if the mental faculties in the regular routine of habitual work do slumber, for it cannot be denied that by it the obedience of the soldier is so deeply rooted that he, I might say, involuntarily obeys the given order. Frequently, especially in war, the soldier will be under such powerful and distracting influences and his mental powers will be so overcome, that we can only hope for implicit obedience, which has been drilled into his very flesh and blood, when he is practised according to custom.

The training by the numbers is preëminently calculated to attain this object. This forces the soldier with the most painstaking minuteness, to execute thousands of times the same movement with lightning rapidity upon the order of his superior, and nothing is so calculated to bring the young soldier to prompt obedience as our good old Prussian "Drill." How rash and inconsiderate are all those who only see in drill a pedantic and even inhuman handling of the soldier! Into what errors have they fallen who will only allow detailed training so far as it grounds the man in the principles according to which he will move when a member of a large body of troops, or who believe it is quite indifferent how the man carries his gun on his shoulder provided he is able to carry it securely upon a long march, or who think it superfluous to practice the "goose step" because one does not so march in the field and more of the same sort!

Whoever views our detailed training from such a standpoint has not even grasped the deep philosophy underlying its use as a means of discipline.

We, however, know its value and we know how effective it is when, after great manœuvres and even in the pauses following the victorious battle, the slow step and "das Gewehr über" is practised by the numbers. What is lost to discipline by the passions aroused during a campaign should and will be restored by a good stiff drill.

* * * * * * *

I have now come to the last and most effective means of establishing and maintaining discipline; namely, the awakening of patriotic feelings.

Patriotism should influence our attempts in the direction of hope. As the rewards before mentioned are of a material nature so the rewards for which the patriotic soldier hopes are ideal. He seeks his reward in the inner satisfaction he feels when he does his best for the good of his fatherland and his king.

(The domain of ideal rewards includes also the satisfaction felt by him who follows the requirements of his religion, and religion should accordingly be used to secure such behavior as we desire in the well-disciplined soldier. A nearer approach to this subject, however, does not lie within the compass of this paper.)

To him who loves his king and fatherland that love will be a never-failing source of strength. From this it follows that he who is inspired by this noblest of all sentiments, the love for king and fatherland, is always ready and willing to give his whole strength for the support of the throne and the good of the nation.

Where such a feeling already exists scarcely any means of discipline, other than general instruction, is necessary; for the powerful emotion of love prompts to those actions which promise the greatest usefulness. Whoever truly loves and esteems a person will as far as possible conform to his expressed and reasonable will, and whoever loves his king will strive to follow implicitly the regulations issued in his name, and therein is good discipline exemplified.

It is essential that we look upon such obedience not alone as a duty but as a source of pleasure, for we know that the eye of his king rests upon the obedient soldier with approval, and in the satisfaction of his king the brave soldier finds his greatest reward.

From this short review, a farther extension of which is unnecessary, as all that I may say is far more eloquently written in all of our hearts, the great value of patriotic sentiments as a means of discipline can be seen. It must therefore be our constant labor to implant these sentiments within the breast of every soldier. Such labor bespeaks true humanity; for thus by mildness we are more effective and upon a greater number than could be reached by the employment of the severest punishment.

And as for those outside of the army who are always contending for a more humane treatment of the soldier, should they not, each in his place, exert their whole influence so that when the recruit enters the army he will bring with him the feeling of love for king and fatherland?

As to the proper methods for implanting and fostering patriotism there can scarcely be any doubt among well intentioned persons. It only requires that from youth up every proper occasion should be seized to refer to the deeds and the exalted greatness of our reigning house and to awaken the idea that a strengthening of the fatherland implies a strengthening of all its children.

* * * * * * *

I have now reached the end of my dissertation. I hope I have succeeded, on the basis of the constitution of human nature, in showing by what means discipline can and must be maintained and how far humane treatment can be applied.

The fact is now established that all human effort is unconditionally dependent upon the awakening of corresponding emotions, that the importance to be laid upon instruction is proportionally small, hardly more than acquainting the instructed with the duties required of him, and that the execution of orders is only secured by those means which work upon the emotions.

These influences must be employed according to experience either in the direction of fear or of hope, for, when all is said, these two emotions control our actions. An habitual action, especially the habit of obedience, is only possible when for a certain time the actor has been subjected to the influence of hopes and fears corresponding in degree.

We have repeatedly shown that the disciplining of the Army in a purely humane manner could be effected if all good conduct as well as some extraordinary action was rewarded; *i. e.*, by working upon the hopes. Such a measure would cause pleasure in doing that which in the interests of proficiency is in the highest degree desirable, and the system of rewards for securing disciplined behavior should only be departed from where the conduct of a single individual may demand it. Here then the feeling of fear is to be worked upon, *i. e.*, to place punishments in prospect and to execute them.

The object of punishment should be to frighten from the commission of offenses which in the interest of the common good and especially of discipline must be suppressed. Punishments are therefore of a preventive nature. From this it follows that when it becomes necessary it must be applied with such severity as will effectively accomplish its true object: the prevention of similar conduct in the future. It is humane to punish as little as practicable and on the contrary to secure the conduct wished for by the judicious use of rewards; it is however *not humane* to be chary of using effective punishments when their necessity is apparent; for humanity towards the criminal is inhumanity towards the well-doer—and in the army towards all brave and obedient soldiers.

When the use of force has been recognized as unavoidable the man of insight will not weakly complain of its severity, for it would be a dangerous concession to the feeling of compassion if on that account one refrained from administering such punishments as are calculated to prevent the recurrence of the crime. Humanity toward the offenders can only find expression in so far as it prevents the use of punishments severer than necessary to attain the desired result; it must never degenerate into an inconsiderate pity.

Concerning the severity and the measure of the punishment we have seen that in special cases it can only be determined by experience, for the different degrees of culture as well as the different objects require the use of different punishments.

Regarded from this standpoint the military code of punishments which with us secures the maintenance of discipline, will be found to contain no punishment which is too severe and therefore inhumane, and it will also be found that those who allege that the persons charged with the maintenance of discipline in the army are not humane enough—rare cases concerning individuals are naturally not here considered—have fallen into a grievous error.

Not those who apply our code of punishments with energy and effect, but those only are guilty of inhumanity who take the offender under an unwise protection, and those again who, so far as opportunity permits, do not seek to inspire the recruit with those sentiments and feelings which bring forth disciplined behavior without a resort to force. These sentiments and emotions can be produced in a high degree by implanting a love for king and fatherland.

THE DEPORT APPARATUS FOR LAYING HEAVY GUNS.

From Chap. XV. Aide-Mémoire a l'usage des Officiers d'Artillerie.

By FIRST LIEUT. HENRY L. HARRIS, 1st Artillery.

FOR a given gun and a given altitude, the angle of fire is a determinate function of the angle of depression, since it depends only on the distance, and that is itself a function of the angle of depression.

It is upon this principle that the Deport apparatus is constructed, by means of which we can give the angle of fire to the gun without the necessity of knowing the distance.

This apparatus is composed: 1st, of a bracket permanently fastened to one of the trunnions of the gun giving a table parallel to the axes of the gun; 2d, of an instrument which is placed upon this table for the operation of pointing and taken away before firing; 3d, of a small buttress fastened to the carriage.

Figure 1 of the Plate represents a side view of the apparatus when in position, the axis of the bore being horizontal. Figure 2 is a horizontal projection of the bracket, sill and buttress.

The frame of the instrument is formed of two bronze branches with a hinged joint; the lower branch forming the sill rests on the bracket which it accompanies in its rotation about the axis of the trunnions; the upper branch to which is attached a level with a very sensitive air bubble, is provided with an appendage serving as a female screw for an adjusting screw which rests upon the buttress.

When the instrument is in position on its bracket the axis of articulation of the two branches sensibly coincides with that of the trunnions; the adjusting screw enables us to bring the bubble of the level between its zero marks.

The frame of the instrument carries the telescope, which is fastened to it by a support.

Near the eye piece, this support has a T-shaped section the core of which engages with slight friction in a space carefully prepared between the faces of the upper branch. A travelling index which carries a horizontal axis about which the telescope can turn, is movable in a groove in front of a graduation whose lines indicate the positions to give it for different altitudes.

At the forward part of the support of the telescope is articulated a guide terminated at its lower extremity by a friction roller of tempered steel. This guide moves with slight friction in a space of the same shape, perforated conformably with the axis of the vertical upright of the upper branch, and its roller rests on the face of a cam of tempered steel which constitutes the essential organ of the apparatus. This cam is mounted on a horizontal shaft about which it can turn.

The shaft of the cam carries a crank stud to which is articulated the

head of a crank-rod whose other extremity is attached to the sill. The profile of this cam is such that the piece is found to be pointed under the proper angle of fire, when the telescope is directed on the target.

MANŒUVRE (1).—*To point automatically at a given target.* The working of the apparatus requires two men who are placed on a side-step of the

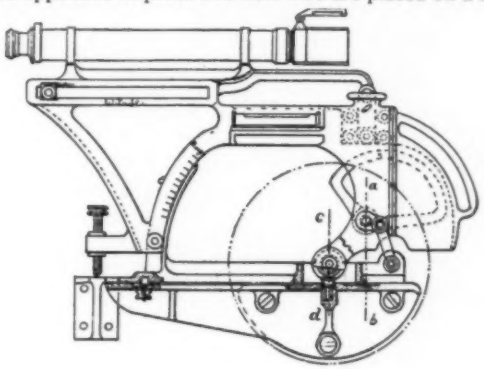


FIG. 1.

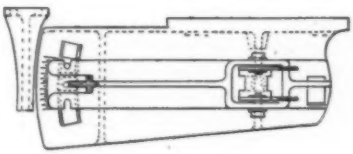


FIG. 2.

carriage. One, facing the instrument, has for his duty the keeping of the bubble of the level between its zero marks, by working, if necessary, the adjusting screw.

The other places the travelling indexes for altitudes and deviations at the divisions indicated, looks through the telescope, causes the piece to be manœuvred in such a manner as to bring the image of the target on the

cross-wires, and thus gives it automatically the elevation and deviation of the tables.

This result obtained, he takes off the apparatus with the help of his assistant. The two gunners descend to the ground and the chief of piece commands: *fire.*

GENERAL INFORMATION AS TO THE METHOD OF EMPLOYMENT.—The apparatus, previously adjusted, gives by simply sighting on the target the elevation and deviation of the tables. *By the displacement of the travelling index for altitudes*, we adapt it to different altitudes, we correct for the effect on the range of the wind and speed of the target, and in fact we regulate the fire as to range. *By the displacement of the travelling index for deviations*, we correct the effect on the direction of the wind and speed of target, and we regulate the fire as to direction. *By the displacement of the cam* along its axis, we engage the friction roller of the guide with the rib which corresponds to the kind of fire employed. *Preliminary adjustment.* This adjustment is effected before each firing practice by sighting on a signal, fixed or floating, situated at a known distance.

Place the travelling index for altitudes at the division corresponding to the altitude for the time being; lower the breech in such a way as to cause the apparatus to indicate the gauge of adjustment (read on the Range Table), which corresponds to that altitude.

The telescope being directed on the signal and the bubble brought *exactly* between the zero marks, use the key on the reticular slide and bring the cross wires on the point of adjustment.*

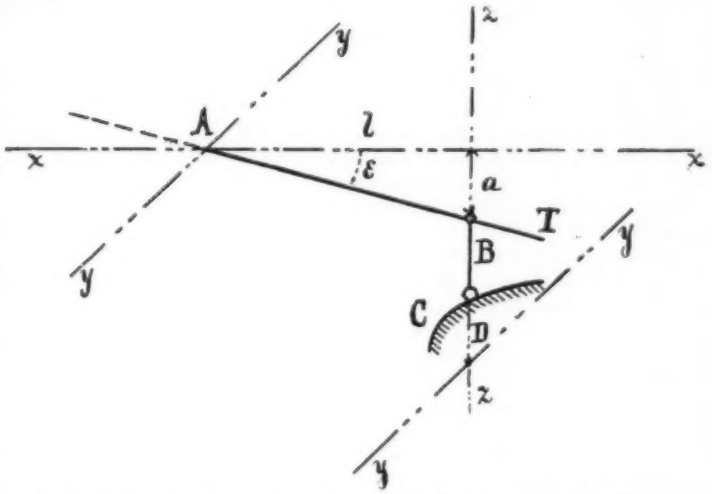
Fire on a fixed target.—Point automatically on the target and read the distance. By the aid of the indications of the anemometer and of the range table, have the travelling indicators placed in such a position as to correct for the effect of the wind; point automatically.—Remove the apparatus.—Fire. Estimate the errors in range and in direction; read on the range table corresponding corrections; cause the apparatus to indicate the new range and clamp the check screw. Place the travelling indicator for deviations at the new division. Make use of the apparatus henceforth as a telescopic sight without the aid of the assistant gunner and without taking any account of the bubble of the level, modifying the ranges and deviations after observation of the shots and as has just been indicated, until the fire is regulated.

Fire on a moving target.—Point automatically on the target and read the distance. By the aid of the indications of the anemometer, from observations on the motion of the target made with the battery telescope, provided with a double vertical cross hair, and from the range table, give, by the displacements of the travelling indicators, corrections in range and deviation. Point automatically.—Fire. Observe the errors, read on the range table and apply the corresponding corrections.—Fire. Thus follow the target with shots at intervals of three minutes at the most, estimating by the aid of the range table, but summarily, the values of the principal corrections, and being guided by the law of continuity.

The principle on which the depression portion of the Deport apparatus

* This is evidently the manner in which the error due to variation of atmospheric refraction is eliminated.

is constructed will be better understood by a reference to the accompanying sketch.



z z x x represents the azimuthal plane in which the target is situated; this is perpendicular to the axes *y A y* of the altitude travelling pointer and *y D y* of the cam, *A T* being a line of this plane parallel to the line of collimation of the telescope when this is coincident with the optical axis. *B* represents the vertical support of the forward end of the telescope terminated at its lower extremity by a friction roller resting on the face of the cam *C*.

In the Deport apparatus the cam *C* for any particular projectile and charge is corrected, so to speak, for curvature and for normal refraction but not for altitude. It is evident that, when the cam is set for the known horizontal distance of a target, if we vary the height of the apparatus above the water level the line of collimation will be directed either above or below the true position of the target according as we increase or diminish the altitude from that point which corresponds to the actual altitude for which the altitude pointer is set. Hence we must be able to increase or diminish the distance *l* which is the horizontal distance between the vertical guide *B* and the axis *A* of the altitude pointer since the angle of depression is a function of *a* and *l*.

Again, when the altitude pointer and the cam have been set for the known altitude and range respectively, the line of collimation although it may be directed at the true position of the water line of the target, will not, owing to atmospheric refraction, be directed on the image of the water line of the target. The error due to variation of refraction is practically eliminated, when the other adjustments have been made, by raising or lowering the horizontal hair.

The correction for drift is made by the peculiar construction of the head of the axis about which the sill revolves.

MOUNTED INFANTRY.

By LIEUT.-GENERAL SIR F. MIDDLETON, K. C. M. G., C. B.

(*From the United Service Magazine, London.*)

IT is now generally understood that no one of the three arms of which armies are composed can honestly be considered, under all circumstances, to be able to act independently of the other two, though it must be admitted that infantry is by far the most independent of the three. It is also the most numerous as well as the most important in a campaign, and by its action battles are principally decided. It can be equipped at a less cost and in less time and trained in a shorter period than the other arms, and is the most easily moved, being almost independent of difficulties of terrain. But it possesses the great disadvantage of being necessarily slow in movement. How often on service is heard the cry of "Where is the infantry?" or "Bring up the infantry." Many a decisive point has been lost, and partial success turned into defeat, for want of a few infantry at the critical moment, and many a reconnaissance checked for the same reason. Even in peace manœuvres and the war-game the disadvantage attendant on the slowness of movement of infantry is made manifest.

We read of attempts having been made from the earliest times to get over this great disadvantage, one remarkable one having taken place about the end of the seventeenth and the beginning of the eighteenth century, when Dragoons were first instituted. These men were mounted and armed with musket and bayonet as well as sword. In theory they were expected to fight equally as well as cavalry or infantry; in practice they were found to fight equally badly, and becoming gradually more "horsey" and less "footy," they were eventually converted into regular cavalry, only retaining their designation.

The Russians, undeterred by the failure of the old Dragoon, have of late years armed a portion of their cavalry with the rifle and bayonet, and have carefully trained them to fight on foot. I believe they did fairly good service against the Turks in 1877, but it has been the subject of remark that in their late manœuvres dismounted cavalry action was very little, if at all used.

In the Franco-German war of 1870-71 the Germans found it necessary to send detachments of infantry with their advanced cavalry, who were frequently being checked by small parties of hostile infantry (mostly "Franc-Tireurs," I believe), holding woods or positions unassailable by cavalry, mounted or dismounted. These parties of infantry were sent forward in wagons, so that they might move with less fatigue and more rapidity. Still the cavalry complained that their slowness of movement hampered them and interfered with their dash and enterprise, though they fully recognized the value of their services.

In a short history of the Prussian 2d Body Guard Hussars during the Franco-German war, by Lieutenant Von Mackensen, he mentions that "during the campaign, infantry in wagons frequently accompanied the cavalry. * * * Our brigadier was very much in favor of them, and willingly

employed them." He further says that their general considered that "the infantry accompanying the cavalry will be an important factor in the fight of cavalry detachments."

In spite of this experience, the Germans have as yet, I believe, shown no signs of taking steps to organize rapid moving infantry, though, from what I can gather, they seem little inclined to use their cavalry dismounted more than is absolutely necessary, being of opinion that a cavalry man should be taught to consider himself everything with his horse, and nothing without it. Moreover, the fact of their arming more of their cavalry with the lance, with which a cavalry man could not be expected to fight on foot, would lead one to think that they do not quite believe that a dismounted cavalry man, with long boots and spurs and tightish pantaloons, armed with a carbine, can hold his own against an active, well-trained infantry man armed with a long rifle and generally posted in a favorable position. In our own army we have from time to time extemporized in the field means of moving small parties of infantry with rapidity. Lieutenant-Colonel Hutton, D. A. A. G., commanding the Mounted Infantry Regiment, in a lecture given by him some months ago, mentioned one case in which this was successfully done during the Indian Mutiny. On this occasion (which is mentioned by Malleson in his "History of the Sepoy War") Captain Havelock, 10th Regiment (now Lieutenant-General Sir Henry Havelock-Allan, K. C. B., V.C.), having obtained leave, organized a mounted company of the 10th Regiment of Foot, and with this small force of mounted infantry, assisted by a few cavalry, he was able to inflict severe punishment on the roving bands of Sepoys, who had hitherto escaped scot-free. Colonel Hutton in the same lecture, mentioned another incident of the Indian Mutiny, from which it may be gathered that, from want of rapidly moving infantry, we lost the opportunity of probably destroying or capturing the "Nana" and all his force on the Raptee River.

Then in India we have had infantry mounted on camels, formed into what was called "The Camel Corps," under the gallant Major Ross (now General Sir John Ross, G. C. B.) Then we had infantry mounted on horses in our South African campaigns where, owing to the absence or dearth of cavalry, they were called upon to do almost cavalry duties. Then again, in the Egyptian and Soudan campaigns, we had infantry mounted on camels and horses. In all these cases the mounted infantry was a success. Taking into consideration, then, these different experiences, I do not think it is to be wondered at that we at last decided to organize regular mounted infantry in our army. However, the idea has not been adopted without meeting with opposition in our own Service, some of our cavalry officers being among its most strenuous opponents. One of the foremost arguments used against it is that we alone, of all the European nations, have entertained the idea of organizing mounted infantry. Now, supposing this to be the case, is that any reason why we should not be right in our idea? Are we not to attempt to initiate any improvements in the art of war, with all our varied and recurring experience in fighting in all parts of the world, but patiently to wait for the action of some foreign army, and then follow it, whether suited to our national proclivities or not?

We used not to think so when we alone, of all European nations, had the two rank formation for our infantry, and always fought in line. And as we were the only European nation who, as Jomini pointed out, could trust their soldiers to fight in line, is it not possible it may be found that, owing to our national characteristics, mounted infantry is more suitable to us, and that its organization will be easier and better carried out by us than by any other nation, for I think it must be allowed that, as a nation, we take to horses and their management more naturally than others, and that certainly our infantry officers, as a body, are more accustomed to horses and riding than are those of any other nation.

Let us suppose that a regiment of infantry was imperatively required at a critical moment at a point some miles off, say to reinforce an important position, and that it happened that a number of horses or ponies were available, and the commanding officer was told he might use them, if he thought proper, for the object in view. If that regiment was a British one, I venture to think that nearly all, to a man, would manage to mount and get to the required spot in time. Would an infantry regiment of any other nation do the same? In fact, if our system of passing so many companies from each battalion through a course of mounted infantry work be properly carried out, a certain amount of rapid infantry reinforcement at a critical moment can always be depended upon by sending back the horses of any mounted infantry already in position to the nearest battalion of infantry.

But those who are opposed to the introduction of mounted infantry into our Service have other points against it besides the *potent* one of its non-recognition in foreign services. The cavalry opponents seem a little disturbed to start with at the idea of putting an infantry soldier on a horse at all. They do not seem to mind so much if the infantry were only carried in wagons or mounted on bicycles, etc., but on horses they seem to think mounted infantry must trench on their duties, and eventually prevent an increase in the cavalry arm of the Service. So far from this being the case, *real* mounted infantry could not possibly do *real* cavalry work, even if they were foolish enough to wish to do so. I believe it to be as unreasonable to expect mounted infantry to do cavalry work as to expect cavalry to do infantry work. Then again, it is urged that our cavalry not only can, but ought to fulfil the functions of both mounted infantry and mounted rifles, and that if they cannot the sooner they are done away with the better, and further, that it is an insult to cavalry to think they want the assistance of infantry! Well, I suppose the leather merchant in the old story was right, from his standpoint, in thinking "there was nothing like leather" for making fortifications with, and so, I suppose, the cavalry man is justified, from his standpoint, in holding the aforesaid opinions, even though they may not meet with general acceptance. Of course, special cases may, and will occur in which cavalry would have to fight on foot, and for this they should receive the necessary training. This belief in the wonderful powers of cavalry seems to be principally based on the accounts of the tactics and actions of the cavalry of both sides in the American War of Secession. Now I happened to meet in Canada, in 1868, an American officer who had served on the staff during the whole war, and he gave me distinctly to un-

derstand that certainly at first the mounted men in both armies betook more of the nature of mounted infantry than cavalry. Some were armed with repeating carbines, and some with muzzle-loading infantry rifles and nearly all with revolvers and no swords. After campaigning for a year or so, becoming better trained, they doubtless began to evince a preference for fighting on horseback; but even then the revolver was used more than the sword. I venture to submit that their experience is not of much use to us or any other European army, for the simple reason that neither side was ever pitted against well-trained and organized troops, either cavalry or infantry.

The fact is that the cavalry of all nations are unwilling to recognize that the improvements in range and precision of modern fire-arms has a strong tendency to alter their ancient rôle very considerably, by rendering reconnaissance and screening the most important part of it. They and some military writers are in the habit of prophesying that all future wars must open with duels between large bodies of cavalry far in advance of the main bodies. But will this necessarily be the case? I will here refer to the remarks on this subject of Prince Kraft (no mean authority), as quoted by Major James, 16th Lancers, in a lecture at Aldershot, January 2, 1891, on "The Development of Modern Cavalry Action in the Field." The Prince writes as follows:—"Under existing conditions, in all European countries, one nation could hardly get more than a day's start in mobilizing, and a surprise would be really impossible. Say the cavalry got twenty-five or even thirty miles on the first day, they must come upon some obstacles—perhaps a river or a fortress. If the former, there must be bridges, and probably towns, and more or less resistance will be met with. Cavalry must take guns, and some wagons for a raid, and these cannot swim rivers. It will be difficult to imagine a case in which the enemy will not be able to assemble at least a battalion to oppose them, and after a fight, even if successful, against a thousand infantry, in what state will the cavalry be for further enterprise? The cavalry will run great risks of severe losses, if not of annihilation, with little chance of success in proportion. When brought to a halt it can do no more than wait for the support of the infantry, and meanwhile send out its feelers. But then it ceases to be a raid at all, and there appears to be no benefit in this premature advance of the cavalry, which will only have had the effect of betraying the intended line of advance to the enemy, or (if the advance is made elsewhere) of taking the cavalry away from where they are most wanted."

The foregoing remarks of Prince Kraft were made without taking into consideration the effects of smokeless powder and the prodigious long range of the new small-bore rifle, which will, I believe, cause a great change in the system of cavalry reconnaissance, and will necessitate more than ever the presence of infantry support close at hand with cavalry reconnoitring, which support can only be efficiently given by mounted infantry. It must now be recognized with reference to cavalry reconnaissance that, under the new order of things, a very small body of infantry may be able to check and disorganize a large body of cavalry. The position of the infantry will be concealed in the absence of the tale-telling smoke, and they can open fire at 1900 yards at least if the ground is favorable for view.

But it is not to act in support of cavalry that mounted infantry should only be used. There are other duties in the performance of which they will be found invaluable. For instance—to seize a tactical or strategical point, and hold it until reinforced, or to reinforce such a point, or weak points, in a line of battle—furnish escorts for field artillery or convoys—for infantry outposts, advanced flank, and rear guards, especially the latter when covering a retreating army. In this case, the infantry, though a most important part of a rear guard, has always been a trouble owing to its slowness of movement, which necessitated its being retired first from a position taken up to check the pursuing enemy; except in the case of the rear guard covering the passage of its main body through a defile, when it is generally necessary that the infantry should retire last. In both cases mounted infantry could naturally hold on much longer than infantry, and thus strengthen the staying powers of the rear guard most materially.

Then, again, the duties of orderlies to infantry outposts now performed by the cavalry could well, if not better, be performed by mounted infantry, as well as the connecting files between detachments of advanced and rear guards, and between them and the main body, thus saving the cavalry from duties not very popular with them, and increasing the fighting strength of their squadrons. A Major Carl Regenspursky, of the Austrian army, has lately written an article, entitled "Mounted Infantry Patrols: the Necessary Result of our Present System of Fighting," the general object of which seems to be to recommend the addition of a certain number of mounted infantry to each battalion and brigade for the purpose of performing the orderly duties for which at present in the Austrian service a certain number of divisional cavalry are told off. He also suggests other duties in addition, most of which are generally performed in our Service by officer gallopers. In his article, Major Regenspursky says nothing about mounted infantry supporting cavalry in the field, but he recommends that the mounted infantry of each corps should be assembled together and trained annually for eight months, and that they should always be considered as infantry "even when mounted." The number he recommends is three in war time and two in peace time for each battalion, and the same for the regimental staff, which answers to our brigade staff, as each Austrian regiment consists of never less than three battalions. These men are always to actually belong to the regiment. Though Major Regenspursky does not exactly recommend mounted infantry such as ours, he gives an incident in the Russo-Turkish war of 1877, when mounted infantry would evidently have been of immense use, and I venture to think that any general commanding an army possessed of mounted infantry, such as recommended by the Austrian major, would not be long on service without massing and using them as we propose using ours. Our system of mounted infantry, of course, causes a little additional expense and requires a little more time to train the men, but the value of their services would more than repay the additional outlay required.

I do not propose discussing in this article the details of the regulations and field service manual for our mounted infantry further than pointing out the necessity, for obvious reasons, of the slight alteration required in their

uniform being so carefully made that it would be difficult, if not impossible, for an enemy to recognize that the infantry opposed to him was mounted infantry, and this, I believe, can be done without difficulty. In conclusion, I will venture to define what in my humble opinion mounted infantry should be. "They should be infantry soldiers provided with a suitable means of locomotion, which they should take care of, and use for the *sole* purpose of proceeding rapidly to the place where they are required to perform their duties as infantry soldiers; not hesitating, if necessary, to sacrifice the said means of locomotion." If the above is kept clearly in mind and acted up to in their dress, training, and organization, there will, I dare to think, be little fear of our mounted infantry trenching on the duties of cavalry, or degenerating into a kind of "Ancient Dragoon," and I can only hope that, should we unfortunately find ourselves at war, we may have a good supply of them and that our adversary may not.

THE IMPORTANCE OF SMOKELESS POWDER IN WAR.

From the Revue d'Artillerie.

BY FIRST LIEUT. W. M. WRIGHT, 2D INFANTRY.

THE question of smokeless powder is the order of the day, and it is certainly interesting to study its influence on the art of war; experience is wanting with it, and we are unable to estimate its value except within the probabilities.

Already the new powder has caused the appearance of a special literature and the most widely diverging opinions are expressed daily. Some declare that it will have no influence on tactics while others hold that it will reduce them entirely to one principle, viz., to see and not be seen. For these people the centre of the struggle is moved to the side of the defense and the cavalry have sung the song of the swans and disappear from the ranks of armies.

In our opinion smokeless powder modifies the application of the principles of tactics without changing the principles themselves, which are invariable. Some of these are very important, as for example, "to see and not be seen"; but in reality tactics never change for they have only to do with two principal factors, man and chance. Tactics establish the principles but application bends them to circumstances. If we consider artillery, for example, the ideal tactics of this arm have always been to employ it in masses; this ideal has been attained in a certain measure by the introduction of rifled guns; smokeless powder enables us to approach still nearer to it by abolishing smoke, the most serious objection to the employment of masses. Let us take the absence of smoke and noise as the starting point of our investigation. We will not touch on the improvement in the ballistic qualities of fire-arms, but will be satisfied by observing that there is a limit beyond

which these qualities are ineffective. We cannot fire efficaciously any farther than sight will allow.

A. THE PROPERTIES OF THE NEW POWDER EXPRESSED IN THE WORDS "WITHOUT SMOKE AND SLIGHT NOISE."

In this chapter the author passes the general qualities of smokeless powder in review particularly in regard to the visibility of smoke clouds produced by the rifle and cannon. He mentions the propositions of several writers to use artificial smoke clouds in certain cases, and he cites, chiefly from Colonel B——, the usefulness of these artifices on the defensive.

He signalizes, as erroneous or at least very exaggerated, the prevailing opinion relating to the decreased intensity of the detonation of arms fired by the new powder.

B. THE IMMEDIATE CONSEQUENCES OF THE EMPLOYMENT OF SMOKELESS POWDER ON THE FIELD OF BATTLE.

1.—The visibility of terrain and the transparency of the atmosphere.

The first effect of smokeless powder is to make the terrain visible and clarify the atmosphere of the field of battle. There will still be smoke from the artificial clouds, but as we have said before they will not be commonly used, and will not be of much importance. The main point will therefore be the disappearance of the smoke, which will result in a much greater efficacy in the shooting of fire-arms; the aiming and observation of shots will be made much easier than formerly.

2.—The objective is not revealed by the smoke.

Formerly a chain of skirmishers or a battery of artillery firing, but well covered by the terrain, disclosed their position by the smoke; smokeless powder has not this inconvenience, but if on one side it does not expose the position, on the other it does not permit one to know where to reply to the enemy.

3.—The absence of smoke clouds.

Formerly prolonged firing produced clouds which, in certain atmospheric conditions, formed a genuine covering in the shelter of which troops could manœuvre, avoid the efficacious zone of the enemy's fire, diminish losses, replenish the ammunition, and if necessary retire from the struggle. These clouds of smoke were also useful in masking the results of the enemy's fire. All this disappears with the new powder, for creating artificial smoke clouds will not give identically the same results, and now we can no longer conceal the losses of our own troops.

4.—The locality of the battle-field will not be delineated.

Black powder shows the situation of the enemy's lines clearly to an observer placed in front of them. The thin clouds of the lines of infantry and the thick clouds of the artillery are in strong contrast, the eye has before it a clearly traced picture of the position. The commander-in-chief, in observation from a distant part of the terrain, can easily see all the unlooked for changes in the struggle and need not be annoyed awaiting the arrival of reports.

5.—The difficulty of reconnaissance and outpost duty.

If the report is only slightly perceptible at short distances, outpost duty would be very difficult. The noise of the old powder acted as a signal for the outposts and prevented surprises. Many think that the new powder will increase the chances of surprise and therefore suggest signal cartridges to prevent it, but the noise is not really suppressed by the new powder, it is too slightly affected by the new powder for the necessity of signal cartridges to make itself felt.

The conditions are entirely different for scouting duty, the new powder by the absence of smoke and the improved ballistic qualities of small arms allows the single marksman to observe the results of his fire without disclosing his position. It will, therefore, be much easier to keep back reconnoitring troops to a greater distance. Patrols will advance with difficulty to the point where they fire effectively, all this will force them to choose their cover and lines of retreat carefully, consequently they will be of slight benefit and the information which they furnish will be less worthy of faith.

6.—The moral effect produced by smokeless powder.

Moral is a thing which depends greatly upon the nervous constitution of the man, and we have hardly a substantial point from which to estimate it. It cannot, however, be passed over in silence as it is to this factor that several authors attribute the greater share of the effects of the new powder. In reconnaissance the moral of the man is reduced and he should have experience in war to bring it out. As for the effect produced in the fight itself we give the principal opinions in circulation. Some of these lay stress on the clearness and distinctness with which the man will observe the scenes of carnage and destruction unroll before his eyes and conclude from this that his moral will be very much reduced. The author of the article "Anderes Pulver, Anderer Taktik" in No. 213 of last year's *Jahrbücher für die Deutche Armee und Marine* writes as follows: "Clearness and silence, characteristics of the use of the new powder, will without doubt make the control of the fight easier, but what man will not feel the effects of seeing his comrades and reserves fall successively, in hearing the cry of the wounded, in clearly perceiving the destructive effects of the enemy's fire; an effect which nothing now covers. The noise of the fusilade and the thunder of the guns formerly drowned the voices of the dying, the smoke partly covered them from sight which lessened the nervousness of the men; now all this will be continually before their eyes. Other writers claim, on the contrary, that as the atmosphere is cleared the new powder will permit the combatants to observe the situation in detail, will relieve them of the painful feeling of uncertainty which oppresses them and consequently raise their moral.

Which is the truth? War will decide, and without doubt it will be the medium between these two extreme opinions. The smoke cloud was rarely thick enough to mask the scenes of carnage from the men but they fought bravely in spite of this. The depression due to uncertainty is not as keenly felt by the uneducated as by the educated man who possesses enough force of analysis to obtain a good idea of the situation. The latter is more capable

of meeting a visible and threatening danger than an uncertain one against which he can see no point of support. Then again the uneducated soldier is especially affected by the outward and easily seen dangers which alone are capable of shaking his nervous system and the uncertainty can do nothing but act keenly on him.

C.—SMOKELESS POWDER ON THE FIELD OF WAR.

We will examine the probable importance of smokeless powder first as to the method of action of each of the three arms, then on the chief tactical control of the troops, finally we will give our conclusions on the attack nd defense.

1.—Infantry.

The visibility of the terrain, the transparency of the atmosphere, and the improvement in the ballistic qualities of fire-arms, increase the efficacy and push back the limits of the fire of either extended or massed infantry. For the single marksman the reason for this lies in the ease with which he can see and observe, but the fire of masses has the advantage of being more easily directed because the commander can control it better and designate the objective more exactly since he has taken a much more complete survey of the field of battle. The transmission of orders is of extreme importance and it is necessary to arrange this so that they may be understood in all the phases of the fight; this is an essential condition to insure all the necessary fire discipline. The new powder will make it possible to concentrate the fire of infantry and artillery on one objective and without doubt this combined fire will be much used especially as the masses of infantry will be able to get the range from the artillery. Thus infantry will no longer fire by chance.

This new condition of affairs seems to be of great tactical importance. The infantry will be able to move their skirmishers in advance of the front and flanks of the artillery so they will form a powerful support for this arm besides receiving valuable information as to the range to use. This combined action will have an enormous effect which will decide problems in tactics much more rapidly than formerly. Moreover all this will result in creating new bonds of comradeship between these two branches of the service and there will also be better fire discipline and less wasting of ammunition.

The author of the pamphlet, "Das Rauchfreie Pulver," believes that the new powder will give the individual marksman an advantage, but its effects will not be so strongly felt in the fire of masses of infantry.

"The individual marksman who controls his own fire will be cooler and will observe the hits and correct his fire better, but in future wars we must not count on the solitary shot, we must depend especially on the fire of volleys executed by men more or less well prepared in time of peace, for these men can at least be required to hold their rifles horizontally and in the direction of the enemy. The apprehension of danger keeps the nerves of the men on a continual strain, the scenes of carnage and the uncertainty of the result add greatly to it; to this might well be added the uncertainty of observation with the old powder, but this is of only a slight omission and

not of any more importance than the others. This single factor having disappeared, will the men see better, will they have less fear of death because they see it more clearly, and will the other causes of error disappear?" * * *

The pessimism of the author does not stop here but can we deny that the absence of smoke permits the marksman to fire better in volleys than in individual fire? If the men see better evidently the fire of masses will be more efficacious. Surely there are other causes which influence this efficiency and do not affect the fire of the individual shot; as, for instance, the direction of the fire on the point where it will be most effective: this direction depends on the observation and direction of the fire which is simplified by the new powder. We cannot measure the moral influence on which the author dwells particularly. With the new powder the impressions of the sight on the nervous system will, without doubt, be more active, but on what sense will they act? This is what is so difficult to determine. In all cases the man will feel himself under the eyes of his chief and his comrades this will certainly restrain him. Again seeing the effects of his fire will give him confidence in his arm and this also must be taken into consideration.

Which is the best manner to derive all the advantages from the new powder? With mass firing or with volleys? In regard to this point we think it well to give the reasons cited in favor of mass firing by the author of a short article in the *France Militaire* (No. 1805, 1890).

"The power of infantry lies entirely in its fire. The new arm has a rigidity of trajectory which increases its accuracy and the absence of smoke allows the employment of mass firing. The smoke which formerly masked the objective more or less interfered with the accuracy. Now the firer in the ranks can observe each shot carefully and this habit should be second nature to him. During instruction everything should tend to increase the accuracy and independent fire will do this most effectively. Volleys executed by command diminish the accuracy in a certain degree because the man who commands the fire cannot be sure that his men have finished sighting at the moment that he sees fit to give the command. This command, which is very sharp, necessitates a quick action on the trigger, thus deranging the aim.

"Volleys cannot be executed unless the men have the necessary coolness and are attentive to the commands. Their use is therefore limited. Is their advantage great enough to justify the existence of a bad principle for so slight an efficacy? Volleys place the control of the fire in the hands of the commander, facilitate its concentration on one and the same objective, permit the correction of the fire by observing the results, and regulate the control of the ammunition. Is it true that officers and non-commissioned officers do not retain the control in independent fire?

"Can they not commence and stop it when they wish? Volleys are not more favorable for concentrating the fire for the objective can be seen as clearly in independent fire. If the non-commissioned officers wish to do so they can easily correct the fire after observing it, and they cannot do this when firing at command.

"As far as regulating the expenditure of ammunition by the employment

of volleys, they are not used frequently enough to be considered in this respect. The commander always remains in control of the fire and varies the intensity of the fire in accordance with the results obtained and not with the object of saving his cartridges, consequently the supply should be renewed when expended. The men must be taught to use their ammunition carefully and not to throw it away in poorly directed volleys. In this manner smokeless powder will have great influence on the fire.

"Smokeless powder will also make the duties of commanders of small units easier." (Smokeless Powder and Tactics, by Capt. Moch.)

"Where does the long-range fire cease and the forward movement commence? This question finishes the advantages of smokeless powder for infantry. The fire of the artillery of the defender will force the assailant to an early deployment and hasten the moment of the assault in spite of great difficulties for the commander and fatigue for the men. Perhaps it will be impossible to keep the supports in hand and the infantry will march in two or three deployed lines, the rear lines serving to support the first, thus avoiding a too great extension of the front of the combat. As far as the control of the combat is concerned every one admits that the influence of smokeless powder is limited, superficial and incapable of changing existing rules. The author of the pamphlet "La Poudre sans Fumée et ses Consequence Tactique," Colonel B——, finds that the precept of not opening the fire at a greater distance than 700 metres is not in accordance with the conditions imposed by the use of smokeless powder.

"Commence firing at long range, move forward when well prepared and not to fire when in movement, should be the rules of the new tactics.

"The precision of the fire with smokeless powder overwhelms everything which halts in the fire-swept zone. These principles though new in our army have commenced to make themselves felt, and we have recently seen them well spoken of by a General Officer of experience, good sense and *savoir*, in a work which is about to appear."

Colonel B—— cites in support of his statements the following extracts from the pamphlet of General Philbert, "Apropos des Manœuvres de 1889": "After the events of last year, infantry will advance as quickly and as close as possible to the enemy's position, having arrived at short range they will move more slowly and with successive rushes. At each of these short halts, which mark the rushes, they commence firing slowly at first, then more rapidly." It is evident, however, that on the majority of terrains such a method would be absolutely inapplicable, and good sense tells us that the best chances of success are in the inverse method.

At the same time that the artillery is knocking the defenders' works to pieces the infantry should commence to overwhelm him with judicious and well-directed volleys. This plunging fire on the position of the enemy does much damage to troops échelonedor masked behind certain points of his position. Under the cover of this fire, which cannot produce much confusion because the troops are calm and entirely in the hands of their officers when not near the enemy, the attackers advance slowly, taking intelligent advantage of cover and of all the folds of the ground. Little by little the commander receives information, he observes and notes the position of the

enemy, the situation becomes more lucid; if he is badly engaged he can still change his dispositions and in a certain measure choose a new objective.

At the commencement of the fight everything must be slow and methodical, but when within good range the movement must be hurried and the pace quickened. To slow up at 600 metres and make halts at from 600 to 200 and 250 metres is but to play the game of the enemy by giving him time to bring up his reserves, reinforce his front and increase his means of resistance, after having clearly shown him the point of attack. Once the attack is determined on and well prepared, go straight ahead, press on, advance and cross all ground that separates you from the enemy with enthusiasm; make a well-controlled halt once in a while, but always advance quickly. To make a prolonged halt is fatal. We state that with modern arms long-distance fire is indispensable.

2.—Cavalry.

Many people are of the opinion that every increased perfection of fire-arms reduces the rôle of cavalry and restricts them to reconnoitring duty. Others think that the introduction of smokeless powder will make it impossible for them even to do this and that they will be forced to leave the field of battle where their attacks *en masse* have become obsolete. If the cavalry wish to stand fire they will, without doubt, do so in an écheloned formation. The rear échelons will have a chance to produce a shock effect because they will be protected from the hail of iron and lead by the first ones.

The shock will not amount to much when squadrons are thrown in confusion at each pace by the heaped-up bodies of men and horses. Can any one say that shock-action ought to cease being one of the means of action of cavalry on the field of battle. Cavalry will be only useful during the periods which precede or follow the fight when they will have nothing to do except with the cavalry of the enemy. During the engagement the cavalry are not used, so they must be kept on the field of battle without exposing them to the uncertainty of the attack. In a rough country it will also be difficult to find cover at the desired distance which will permit them to commence the pursuit or to stop the success of the enemy at the proper moment.

At first the new powder has increased the military force of the three arms, but their relative weight remains the same in spite of its introduction. If the conditions of the struggle are modified by it, man who employs these conditions remains invariable. Sometimes the principal factors of tactics are on the side of man and at other times on the side of chance. The combination of a given situation with the military capabilities of the men aided by circumstances favorable to their development will disconcert probabilities technically deduced from the perfection of arms. Therefore the decrease of the tactical worth of cavalry is not probable on account of the psychological factor which enters the problem. The pessimists give recent improvements in fire-arms as the commencement of the decadence of the cavalry. They say that cavalry represents shock-action as much as artil-

lery represents fire-action and that infantry combines the two. What can the perfection of fire-arms take from the cavalry? Absolutely nothing, for they are above all things an arm *à cheval*. Whoever is able to utilize the progress of fire-arms with cavalry must transform them into mounted infantry, that is to say, abandon its proper means of action (shock), in other words reduce the employment of the cavalry to information and courier duty, thus compromising their very existence as an arm. Such are the arguments of the pessimists and they can be called false without the slightest hesitation. Far from losing ground by the perfection of fire-arms the cavalry have only gained, without regard to the progress of fire-arms or the nature of the smoke. The various duties of cavalry are as follows: securing information, the pursuit, and the protection of the retreat.

The anonymous author of the pamphlet "Wird das Rauchschwache Pulver die Verwendbarkeit der Kavallerie-Beeintrachtigen" is a warm defender of the cavalry, and he gives a more complete idea of the future rôle of cavalry than ours, which we give as follows:

"Cavalry covers the military operations of armies, and the opposing cavalry forces thus come into action before other arms. They mask the armies and form a curtain which only a fight can pierce. The cavalry which has the best of this preliminary fight can obtain information while pursuing the others, and will thus bring back reports of the troops and the position of the enemy. A few battalions of skirmishers and batteries of artillery can act in concert with the cavalry at this time, but the mounted men will play the principal rôle and the action of magazine arms will not change the conditions. Without doubt the former fire of battalions of skirmishers created a curtain behind which disordered cavalry were able to reform, but this did not prevent the others from turning the flanks without interference while the infantry of both sides were occupied. We cannot do without cavalry, they are the eyes of the command, it is necessary to see in spite of the progress of fire-arms, they must act in masses bound together by patrols and they should be sufficiently large to have shock enough to attain their end. The solitary divisions of infantry have too little mobility to resist in spite of their rapid fire and the cavalry will succeed in turning them. Only cavalry will be able to cope with cavalry at this time. The army whose horsemen have gained an advantage over an incompetent adversary will force them to give battle in an unfavorable position. As the cavalry only furnishes general information it is necessary for the columns to march with feelers, so to speak, which cover them from meeting the divisions of the enemy thrown out in advance and from being cut from their communications and other accidental obstacles. It is no longer an affair of independent corps of cavalry, who having discovered the enemy, will force him, harass his flanks and give early information of his general direction.

"To obtain detailed information regiments of cavalry must be organized with divisions of infantry in corps and should be spread out in a network of patrols on all sides as feelers of the great tactical organization. This network having come in contact with the infantry of the enemy, will of course

be compromised by being near this arm. They are not expected to gain tactical successes, it is sufficient for them to bring the infantry, which they cover, information that the position is occupied by the enemy, then they will disappear on the flanks to seek information regarding the enemy's force and dispositions. This duty will not be carried out without losses, but we believe that (even with the new arm) the sacrifice will not be out of proportion with the result obtained. The losses will not be as terrible as they would appear at first sight; even if they do feel the effects of one or more volleys they will not lose time and will disappear rapidly. The presence of the enemy is assured, they have accomplished their end and have only to take up a position elsewhere.

"Evidently the gallantry of the man and the quality of the horse play a large part, but the horseman must be convinced that he is not a target for all the bullets. The new powder does not make reconnaissance duty very difficult, but it is imperative that it should be done with great skill.

"The infantry on account of the slowness of their movements cannot take the place of the cavalry. Let us continue; all information emanates from the presence of the enemy, the advance guards commence to skirmish, the battle commences. From this moment the cavalry, in accordance with the opinion of many people, have nothing more to do. It is evident that cavalry cannot be launched against an unshaken enemy, consequently they are not an active factor during the fight. Once the infantry is engaged the cavalry retire to the flanks and wait for a favorable opportunity to attack. Although the cavalry commander may be tied to the commander-in-chief by orders, he must take advantage of all opportunities in spite of this fact. He decides, and in doing so does not lose sight of the progress of the battle; he can either profit by the moment when the infantry of the enemy are out of cartridges or sacrifice himself to support his own infantry when he sees them shaken, hesitating, and about to retire. He can also take advantage of the moment when the enemy launches his reserves, to try and gain an advantage by a counter attack or a diversion which will give the victory to the friendly infantry. The cavalry will suffer losses, but does not the artillery suffer also? In all cases the success of cavalry depends on the employment of masses. If the three first échelons are stopped by the infantry the three last will pass over them and charge the defenseless artillery, who will fall in their power. This can only happen against shaken infantry and will not be without serious risk, but modern history shows that the losses of cavalry under these conditions are insignificant, and the results obtained are unprecedented. What are the losses of the squadrons of Bredow at Vionville, in comparison with the grand results obtained in aid of the assaults of the Prussian infantry?

"Others think that the new powder will make a chimera of the cavalry charge because the coverings of smoke will no longer prevent the infantry from overwhelming them with fire. The absence of smoke will increase the moral of the charge a hundred per cent. and this moral effect will not be destroyed by the expert direction of the fire, its rapidity, or its accuracy. One must have *sang froid* to be able to take advantage of everything, and it is hard to keep this feeling up at such a critical period. Cavalry will be

engaged more often than formerly with troops who have fired away all their cartridges.

"If cavalry depended so much for its existence on the improvements in fire-arms they lost the right to exist twenty or thirty years ago, but as the human soul is superior to matter so will there always be moments when no infernal machine will be able to oppose an energetic charge of cavalry. It is worth remarking, however, that in the recent great wars they did not use cavalry in masses. From this fact many people believe that the *élan* of cavalry has been annulled by the advance in fire-arms.

"The opponents of cavalry cannot deny the preponderating part played by this arm in pursuits, for under present circumstances they do more than they did before. It is evident that infantry can expend their cartridges very rapidly in spite of the severe fire discipline and well governed supply. The soldier will face the enemy until his last cartridge is gone when a determined charge of cavalry on the flank will force him to retreat and cause great disaster. At such a time as this the absence of smoke will be of advantage to the cavalry in permitting them to judge the terrain better and to direct their charges on the most vulnerable points. They can also attack the cavalry of the enemy before attempting the infantry. It will also be a good thing to have all the cavalry well in hand, throw one part against the cavalry of the enemy and the other against the infantry. In order to do this each division of cavalry should be sufficiently strong so that when divided in half the fractions will be able to act in masses. When the enemy's cavalry has been dispersed the results of the pursuit will be very beneficial. Thus an energetic pursuit by the Germans at Weissenburg and Worth would have annihilated the French armies, but they were not destined to receive the orders. Frederick and Napoleon have decided battles with cavalry alone, but it *must be employed in masses*. If this principle is adopted for other arms it must necessarily be adopted for them also."

These ideas of the anonymous author of the pamphlet, are therefore directly opposed to those who deny the military value of the cavalry by supporting themselves on the apparition of smokeless powder.

We will return gradually to the true traditions of the arm. Smokeless powder will aid in giving new life to old but always true principles. We sometimes find by leaving a road that we were not following the right one.

LETTERS ON INFANTRY.

By PRINCE KRAFT ZU HOHENLOHE-INGELFINGEN.

Translated by 1st Lieut. CARL REICHMAN, 9th Infantry.

XVI.

THE COMMAND OF A BRIGADE.

B.—TACTICS.

WHEN large bodies of troops take an active part in war or manœuvres the place where the commander takes post is of the utmost importance. You know that the form of the general orders as well as of the dispositions for marches and battles of army corps, invariably adhered to by the general staff, always gives information, either at the beginning or at the end, where the commanding general is to be found. During the war of 1866, the standing order in the second army directed, in addition to this, that every regimental commander was to march invariably at the head of his regiment. The brigade commander must, like a corps and division commander, inform the troops of his whereabouts. This, however, is not sufficient; he must in addition remain there and not leave it, at least not without detailing an officer to give information where he has gone. It may happen, it must indeed happen every day, that the commander suddenly thinks it necessary to ride to this or that point. He hears an engagement going on to the right or left and wants to observe what is taking place from a height lying off the road and promising a good view. Or there is a hill where he can observe the terrain and wishes to see for himself, whether it is suitable for a position. He sees some irregularity in the column which he wishes to check, for it is of the utmost importance that he enforce obedience to the marching orders and see that the prescribed order of march is carried out and in general watch over his troops, and interfere quickly in person where he deems it necessary, in short he puts spurs to his horse and dashes off, his staff follows without knowing where. Perhaps he meant only to ride to an adjacent height a few hundred paces distant, from which he could get a good view, but his attention became otherwise engaged, he rides on and nobody thinks of sending word as to his movements to the point previously named.

Such things happen so frequently, that I think it worth while to call attention to them. And where they do happen, the commander is taking one of the most important cogs out of the system of wheels of the mechanism of command and may deem himself fortunate if it does not come to a standstill altogether. In my letters on cavalry I mentioned a case, where a division commander had ridden ahead to reconnoitre and could not again find his division on that day nor the division him. In one of our manœuvres I commanded the outposts, and my superior had informed me the day before, that he would remain in his cantonment, two miles in rear of my post, until 7.30 A. M. After daybreak I sent the reports of the enemy to that point.

The officer covered the distance on his excellent horse in three-quarters of an hour, but my superior had ridden off at 7 A. M. The officer hunted for him and found him an hour later at the front, on the line of outposts, 2000 paces from my post. The young officer had nearly killed his best horse, and after comparing the time of the departure and arrival of the message, was greeted with the words: "You do not seem to like fast riding, since it takes you an hour and three-quarters to cover a distance of 2000 paces." For the reports about the enemy were now too late to base dispositions upon.

In another manœuvre a general commanding a mixed infantry brigade, left his place in the column in order to reconnoitre a position in his right front as to its suitability for defense. In the meantime his cavalry sent in a report about the enemy. He could not be found and the officer who brought it dashed off in the direction the general was said to have taken. The latter unfortunately was a fine horseman and rode a fine English half-blood so that he could not be overtaken. The brigade in the meantime continued the march, while the report would have caused the general to occupy that position. Thus the brigade, in marching column came right upon the enemy, was enveloped and drawn into a very unfavorable engagement when the general hurried up to the head of the column. The report reached him after the engagement.

We frequently read in war history, that an order or report did not reach its destination. This happens much oftener than we hear of it, because it is only mentioned when followed by serious consequences. Seldom or never, almost, do we hear that it was the fault of the person addressed, yet this is surely as often the case as that the sender made a mistake. Untimely zeal is frequently the cause. The higher the commander, the more circumspect and slow must he be in leaving the place where his superiors and subordinates expect to find him, no matter how good a horseman he knows himself to be. In the war of 1870–71 our corps commander remained with great persistency at his post or place in the column which had once been announced to the troops. Whenever he left it to reconnoitre, the chief of staff remained in his place, with power to give directions for him or in his name, but in most cases he preferred to let the latter do the reconnoitring. He had gained experience while holding the same position in the war of 1866. Thus it came about that in all battles and engagements reports never had to hunt for him long; no misunderstanding happened and during the whole war the mechanism of command in the Guard Corps worked like a clock and left nothing to be desired. What I have said did not of course apply when there was danger in delay as for example at the battle of St. Privât when the attack threatened to come to a standstill and the losses were great, the commanding general went forward to the foremost line and gave his orders.

Such exceptions do not set aside the rule. No one will blame Prince Frederick Charles, because on the 16th of August he left his headquarters at Pont à Mousson, where all reports were sent, and arrived at the battle-field of Vionville-Mars-la-Tour, nine miles distant, in a half an hour, although only two of his corps were engaged there. No one will blame General von François, because at the decisive moment he placed himself at the head of

the 9th company of the 39th, and paid with his life for securing the possession of the Rothe Berg, even though the 27th Brigade was left temporarily without a commander, the situation, however, was not an ordinary one. Moreover General von François acted, regarding his own movements, in exactly the way which I consider the only correct one in a prearranged combat; for he left the place from which he gave the orders to his brigade, only when his last reserve had entered the engagement; he fell at the head of his last company, all the rest had been thrown into the fight.

A commander of smaller bodies can ride to and fro within the limits of his command, for these are not so extended but that he can be easily found from all points of his part of the battle-field. This will apply to a company commander and perhaps to a battalion commander also. A regimental commander must be slower to move. But a brigade commander may, as a rule, leave his post, or place in the column, only after leaving somebody in his place to give information of his whereabouts, or after turning over the command for the time of his absence to the senior regimental commander present. He must also remain at his post when the brigade is forming for battle, and does wrong if he exposes himself prematurely with the foremost companies and thus jeopardizes the unity of command of the brigade without necessity. Sometimes perhaps he will be compelled to expose himself somewhat at first in order to understand the situation, or to reconnoitre, and make proper dispositions. But when the last reserves of his brigade go forward he belongs in the foremost line.

It might appear as though this rule would unduly circumscribe the personal movements of the commander. But this will always be the case in war, even the highest commanders have no personal liberty. In one of our campaigns I reported my arrival at the appointed place to my superior, who was standing on a hill. We could see and hear a severe engagement going on to our right and left, and more than 4 miles distant. "I am in a desperate situation" said the general. "On our right one of my corps is engaged, on our left another. This day is decisive for the army, and I am condemned to remain here doing nothing but smoke one pipe after the other, for I have announced that reports will reach me on this height, and if I go away, I bring confusion into the whole army."

When the brigade passes from the march to an offensive engagement, the brigade commander will endeavor, as soon as the leading battalion meets with obstinate resistance, to turn the enemy and take him in flank. This tendency is apparent in every engagement in the last war. As soon as the enemy's position is but half made out, detachments are sent against his flank. But this can only be of use, as I have mentioned before, when done so far in rear, that the troops directed against the enemy's flank can execute the movement beyond the zone of his fire and immediate action, thus gaining a new line of approach as it were. Thus in the example formerly quoted, of the engagement at Oeversee on February 9th, 1864, we see the two companies of Austrian Jaegers taking the road to the left against the enemy's right flank, as far back as Froerup, while the two battalions of Hessian infantry turn to the right in the low ground of the Treene Creek. If in such a case the ground near the enemy does not afford cover the

troops operating against his flank must turn off far in rear. Thus we see at the beginning of the battle of Spicheren, the second battalion of the 74th, which had already advanced on the right flank from Deutschmuehle on Drahtzug, reinforced from Repperts-Berg by the 3d battalion (3 companies) of the 39th, in order to threaten the right flank of the enemy's position on the Rothe Berg two miles distant. The increased range of fire-arms increases the distances which infantry operating against the enemy's flank must pass over and they get more and more out of the direct control of the brigadier. The more circuitous their route, the farther they are separated from the brigade commander, the greater the difficulty of insuring their timely arrival and advantageous coöperation increases, as infantry unlike cavalry, has not the means of shortening the distance by marching at a higher rate of speed. (If some time ago during the Crimean war, a French newspaper reported, that this or that division or brigade went for miles "au pas gymnastique," I simply decline to believe it and every infantryman will share my opinion.) The troops which make the turning movement are left to shift for themselves and those who must attack in front, are greatly embarrassed as to the time when to deliver the decisive blow. If they attack too soon they may be repulsed before the flank attack is made; if they attack too late, the flanking troops run the risk of being cut off and of—excuse the vulgar expression—running into the jaws of the foe.

This difficulty of launching a flank attack at the right moment becomes very great, even in peace manœuvres. I have even seen an instance in a peace manœuvre without enemy (*i. e.*, with the enemy outlined, who acted according to the plan of the manœuvre) where the flank attack could not take place at all. The turning troops lost the direction, took one hill for another, because the ground viewed from the side looked quite different; some other mistakes were made, the thing failed. In war the object to be flanked is marked better by the combat itself than in peace manœuvres without enemy; but in war doubts of another kind arise. And it is not a misfortune if in time of peace a movement fails for, as General von Schreckenstein used to say, "errando discimus." But still such a failure in a manœuvre without an enemy is unpleasant, for he who has the manœuvres carried out, wishes to show to those under him how he wants the movement executed, and not how he does not want it. After receiving in practice some very unpleasant lessons in this regard, I made the following the rule for myself and my subordinates in order to have the flank attack carried out at the right moment:

In a manœuvre without an enemy or with the enemy outlined, the commander, after instructing and detaching the troops to make the flanking movement, must start the frontal attack, so that the enemy is kept busy in front by a containing fire fight, while the forces designated for the decisive attack are held back. Then the commander quickly joins the flanking troops, to lead them in person to the point from which they are to attack. Only when they have formed there according to this plan and are ready to attack, he rapidly rejoins the front and directs the main attack. (Thus did General von François at Spicheren; he rode over to the right wing, made the necessary arrangements there, turned the command of the right wing

over to Colonel von Pannewitz, and then rode back to the Rothe Berg.) If it is impracticable for the commander to ride thus backward and forward, he must at least remain with that wing of the front or of the flank attack, which is nearest the other. When his troops once understand how he wishes the flank posted, he may rest assured that the flank attack will be correctly carried out, though he be absent, for in a manœuvre against an enemy, or in war, he cannot always leave his main body and has usually to remain with the frontal attack. Then it becomes necessary to attach a mounted officer to the troops directed against the enemy's flank whose only duty it is to ride quickly back and report when these troops have reached a certain point. The commander himself must remain with the wing of the frontal attack nearest to the out-flanking troops. You think, perhaps, that the noise of the engagement would indicate whether the flanking troops have advanced so far that it is time to push the frontal attack. But nothing is more deceptive than the noise of battle. It has sometimes happened that nothing at all could be heard of an engagement close by to the leeward or in a ravine. Before Paris 24-pounder shells came from St. Denis, yet the troops where they struck never heard a shot. In the mountains the echo deceives one as to the direction from which the sound comes, but such acoustic deception is possible in the plains also. I recollect very well a drill on a plain, where I mistook the fire of my troops posted on my right front, for the beginning of the flank attack, and thus spoiled that part of the exercise. But why should I write you all this? You witnessed yourself in 1866 the celebrated alarm of the Woylachs, where the shaking and beating of the Woylachs* in the narrow valley made such a deceptive echo that it sounded like a severe infantry fire in rear of the bivouac, and spread fear and terror among the trains. Even in slightly undulating ground in Alsace at some manœuvres during a heavy rain, we all believed that a severe engagement was taking place behind the heights on the flank, and a party was put in motion for that point. Nothing was to be seen however. The engagement took place three-quarters of a mile away, at the detachment exercises of another brigade.

Everybody knows that the attacks on front and flank must coöperate, if the result is to be favorable. The enemy must be kept busy in front by a containing action in order to engross his attention, until the flanking troops are ready to act, because otherwise the enemy will soon perceive the threatening movement and bring it to a standstill. As soon as the flank attack takes effect, the front of the enemy must be vigorously assailed, for he is very sensitive about his flank and would be able to detach troops from his front to protect it. It has happened that the flank attack drew the enemy so much in that direction, that the frontal attack finally succeeded and was decisive. The most striking example of this kind is the assault on the Rothe Berg in the battle of Spicheren. This position, from which the enemy maintained a murderous fire from successive rows of trenches overlooking the ground for a mile, appeared impregnable at first, so that from the beginning pressure was brought to bear on both his flanks. These

* It is a saddle-blanket.—Translator.

turning movements took place on the right through Drahtzug, on the left through Tief-Weiher. At first they seemed to gain ground, but they were unable to advance beyond the southern border of the Pfaffen Wald and Gifert Wald, while on the right wing, in the Stiring Copses, the battle was fluctuating. Even after 1 P. M. it was deemed impossible to scale the Rothe Berg. "Some attempts of a few daring men were defeated" (official account). But about 3 P. M. the enemy's attention had been more and more drawn to the right (p. 36); and the rifle battalion of the 74th, followed by a company of the 39th, scaled the rocky declivities and surprised the enemy's rifle-men in their trenches; yet the latter had seen these troops advancing over the low ground in front two hours before. The assault and capture of the Rothe Berg decided the battle, for although the enemy gained some ground later on in the Gifert Wald, it was but temporary, and at Stiring Wendel the battle fluctuated until 6 P. M. But the bulwark of the Rothe Berg remained in our possession.

Such timely coöperation of front and flank is always difficult to insure. It requires a tactical eye, which can correctly judge the enemy on the ground. It requires great activity on the part of the brigade commander, and it requires above all an iron composure, which will not allow itself to be carried away to premature and precipitate attack, but knows how to wait for the proper moment with patience. And with all these it is possible that an unforeseen event, an accident, a misunderstanding may paralyze the action of the flank. Afterward it is easy for critics to exclaim in surprise: "Why were they not taken in flank here and there?" "La critique est aisée, mais l'art est difficile."

It seems comparatively easy to strike the enemy's flank, if there is a good defensive position, in which the reserves can be écheloned behind the wings, whence they surprise and outflank a turning movement of the enemy, or if the foe be attempting a frontal attack only, to swing around and strike his flank at the moment when he is most sharply engaged. The surprise, which must be part of the effect of a flanking movement, is facilitated by the fact that the defensive position is usually taken up on the crest of a height, which conceals everything behind it. Our "position engagements" around Metz and Paris furnish many examples of such sudden flank attacks made from a defensive position. The greatest of these examples is the counter-attack of the French infantry from Avinvillers against the artillery of our IX Corps in the battle of August 18, 1870.

To make such counterstrokes as effective as possible, the front of the position must be held by as few troops as possible and as many reserves as possible écheloned behind both wings. Since we are able to construct rifle trenches in a short time with the infantry spade, we can in most cases spare still more troops from the front and put them in reserve (p. 154 and 155 of the drill regulations). There is one point about rifle trenches that has frequently provoked me to anger in the manœuvres. I do not know how it is, but however great the dislike of the German against digging in the ground and preparing a defensive position, however much the German soldier prefers in battle to go ahead and lay about him—if the rifle trench is once there it exercises a magic attraction. How often at manœuvres do we see

a rush made for the trench, so that it gets filled up and that finally so many men are lying in the trench close together, if not on top of each other, that they prevent each other from firing. Frequently also the rifle trench is constructed so shallow and narrow that the cover it is supposed to give is an illusion, and the feet of the men project up in rear as a sort of butt for the bullets which miss their heads. Unless it is strictly insisted upon that the trenches be made broad and deep enough the men get an entirely wrong conception of their value. The same is the case if too many men are put into the trench.

I must admit that in the peace manœuvres many false ideas arise from the fact that there are no losses in battle, and that there is a temptation to occupy the front too densely in the manner stated as soon as it becomes necessary to use the supports at the critical moment. But these supports in a real engagement would be employed to replace losses and in spite of them to maintain the full intensity of fire of the shelter trench. For in the real engagement the hostile bullet unfortunately takes good care that our lines do not remain too dense. Still we should not be misled in time of peace into crowding the rifle trenches; and in order to indicate the reinforcement by the supports, these should come up and fall back again after delivering a volley. When I picture to myself a well-conducted fire fight carried on from a rifle trench, every man, who of course must have his pack lying by his side in order to replace the expended ammunition from the supply carried in the pack, must occupy a front of two paces in order to shoot comfortably, *i. e.*, as well as possible. A trench should therefore not be occupied denser than one man for every two paces. For a front of 1000 paces, 500 men would suffice, and I consider a battalion at full war strength sufficient to man 800-1000 paces of trench and furnish the immediate supports in rear. I think therefore that if a brigade is to occupy 1600-2000 paces of rifle trench (nearly a mile) I would divide the line in two halves, occupy each half by one battalion (one from each regiment) and échelon the other two battalions of each regiment behind either wing.

Since I have once started to criticise, I will mention something else that has often attracted my attention in all manœuvres and frequently in war also. When writing on cavalry I mentioned that, when cavalry makes a charge in an infantry combat, the infantry, as soon as its fire is masked, watches the charge of its cavalry with a heart full of sympathy and best wishes, but remains otherwise inactive instead of using the moment when the enemy fires on the cavalry, for rushing forward, gaining as much ground as possible, and, if practicable, assisting the cavalry by fire delivered at close range. At this moment infantry is usually seized with a feeling of relaxation, of rest, they watch with surprise and curiosity the spectacle unrolled before their eyes, as though brother infantryman meant to say to brother cavalryman: "Now it is your turn." I have several times at manœuvres worked out charges of this kind with enemy outlined. Although I had previously announced my intention of giving the infantry an opportunity to practice in coöperating with a cavalry charge; still in every instance I had to ride over or send them word in order to get them forward at such a moment. The reason for such, otherwise unknown, inactivity on the part of

our infantry arose simply from the fact that they were not used to work like this, they had never done it before. They had had too little practice in fighting with cavalry against a common object.

The effect produced by infantry, which suddenly assists its charging cavalry with rapid fire at close range, is most powerful, especially against hostile cavalry, on account of the surprise. In order to judge of this one only needs to read the description of the cavalry fights in the battle of Königgrätz to perceive what great influence was exercised upon the result of the great cavalry combat by bodies of Prussian infantry, which had quickly and, in most cases, independently pushed forward. Wherever the masses of the brave Austrian cavalry had the advantage, their charges broke up before the unexpected rapid fire from Stresetitz and Langenhof, and even the isolated deployed platoons of Lieutenants Daum and Oldenburg advancing beyond the sheep farm of Langenhof, threw a great weight into the scale, until the successively arriving regiments of Prussian cavalry were numerous enough to drive back the Austrian cavalry altogether.

I see you smile at this and seem to hear your objection, that I have just demonstrated that there was no such want of energy on the part of the infantry during the cavalry charges. You are certainly right in this single instance. But has this been observed everywhere and at all times? Please excuse me from enumerating examples to the contrary from our wars, as these might tend to throw blame on some one. I do not feel justified in doing so. A cavalry combat fluctuates and its result is uncertain. Ground won by it may be as quickly lost. The victory won by the cavalry gains its first real support, when the infantry come up. They give a provisional certainty of occupation until the artillery takes post on the ground won and with its bass voice announces the final possession. These two arms, the infantry especially, must hurry to make good the success of the cavalry.

While speaking of the success of infantry with cavalry in battle, it may not be out of place to say a few words as to the action of infantry against cavalry. I might simply refer you to the behavior of our infantry in the campaigns of 1866 and 1870–71, for there our infantry was invariably victorious. It became convinced that infantry which has no fear of its foe, is invincible against cavalry, and demonstrated practically that this is the case without reference to the formation of the infantry. Numerous incidents from the battles of Gitschin, Königgrätz, Woerth, Sedan prove this and need not be recalled to you. You may perhaps smile again at this and take exception, because I stated in my letters on cavalry, that this arm might still be successful against infantry, and should not be blamed even for charging intact infantry. But my dear friend, you must consider that the Prussian, that is to say the German, cavalry will never be in a position to charge Prussian, that is to say German, infantry. What I am saying here, has little about it that is scientific, general, objective. But you must remember I am not writing a theoretical, abstract work, but am talking to you about individual cases as Prussian and German officers talk among themselves about special matters.

Since the war of 1866 our infantry has abstained from the practice of forming squares against hostile cavalry. Immediately after the first successes of the battalions of the Body-Guard regiment at Gitschin, which re-

pulsed in line the most vigorous charges of the enemy's cavalry, this system was published to the whole army in a general order. And in the whole war of 1870–71 I believe there is not a single instance where German infantry formed square against the enemy's cavalry, excepting the band of the fifth Jaeger battalion in the battle of Sedan, which is represented with historical correctness in the "panorama" on the Alexander Square in Berlin.

I attribute the real cause of this circumstance to the fact, that with the present range of the infantry rifle, cavalry must take more circuitous routes to gain the flank of a line of infantry, and that the latter thus gains time to change front and face in the direction of the charge. We find that lines of skirmishers when charged by cavalry, remained quietly lying on the ground and continued their fire, and even when the charge passed over them, they were not destroyed nor did they suffer heavy losses, for the horses as a rule avoid stepping on a live body, preferring to jump over it; when this happened the skirmishers would fire into the rear of the cavalry charge which rushed on (at Vionville, Sedan) against the lines of closed companies which waited to receive them. In 1866 it happened more than once, that skirmish lines remained quietly on the ground. I am told concerning the cavalry charges repulsed by the second and third companies of the 21st regiment in front of the Sadowa woods, that the skirmishers repulsed them lying down, and that one man only was wounded by the cavalry "while he was endeavoring to fall back on the supports." This requires in the first place an infantry well trained, steady, and having confidence in their rifles. Accordingly we now see the lines of infantry and swarms of skirmishers on the drill ground, when the signal "Prepare for Cavalry!" announces the approach of cavalry, change front in the direction from which the cavalry is supposed to be coming, and deliver volleys and rapid fire with 400 meters elevation.

On such occasions I noticed frequently, that part of the lines wheeled to the rear in order to form abreast of the rest. This practice, especially on the part of skirmish lines which must execute such wheels at a run, I consider very objectionable because the troops changing front, run with their back to the enemy, and thus as it were, run away from him. Nothing is more depressing than to be running with the back to the enemy, especially if he consists of cavalry following at a charge. The human heart is so constructed, that it will be upset by certain things. It is one of the most objectionable peculiarities of the square formation, that the soldier must run away from the cavalry, when square is formed, and believes himself lost, if he does not run fast enough. We have seen in recent times, how at Suakim the Egyptian troops armed with the most improved arms, when once they had begun to run from the enemy, were miserably spitted by the savages armed only with spears. This arises from the fact that when running back, men cannot observe what the enemy is doing. All that is changed if one runs toward the enemy. Besides it impresses the cavalry when the infantry runs toward it, and is apt to make the horses shy. For this reason I invariably insisted that the change of front, made for the reason stated, was made toward the hostile cavalry though it necessarily caused here and there an interrupted, broken front or an échelon formation.

It would seem to me that our infantry in their present condition, can do without the square. An inferior infantry however, being perhaps newly formed and not having gained sufficient coherence or efficiency in firing, and thus sufficient confidence in their rifles, may still find themselves compelled in the future to have recourse to the square. To such considerations may be due the fact that the square formation was not eliminated from the new drill regulations.

But a few weeks ago the British, in front of Suakim, moved in large squares against miserably armed savages. From mere newspaper reports we cannot judge from what considerations they acted thus, nor express an opinion, whether or not to approve this mode of action.

THE "LAVA" OF THE COSSACKS AND THEIR MANNER OF FIGHTING.

From the Revue du Cercle Militaire.

BY LIEUT. J. C. BUSH, 5TH ARTILLERY.

THE manner of manœuvring and fighting peculiar to the Cossacks is but little known or understood outside of Russia. This should excite no surprise, however, when we consider that in Russia even the fighting traditions of this warlike people have so fallen into disuse that a Russian military writer has thought it necessary to remind his compatriots of them in a study that has just been published in the *Voënnii Sbornik* and of which we give a résumé.

The author of this study thinks that if they no longer attach the same importance to the Cossack population to-day as formerly, and if the troops which these people furnish have no longer the same value, this results solely from the fact that these troops have ceased to receive military instruction suited to their natural qualities, to their mode of recruiting and remounting.

He calls to mind that the Cossacks alone represent a cavalry effective nearly equal to three times that of all the regular Russian cavalry together, and insists that nothing should be neglected to make such a force the best possible. The past life of this people has been spent for the most part in wars where they fought divided up into small groups. This it is which has made the Cossack the type of individual combatant, of unrivalled partisan. This is his essential quality, his true nature. It is from this point of view that we must consider him in determining the kind of military instruction and education best suited to his needs.

It will be said without doubt that the conditions of modern war demand of the Cossacks something more than fighting in little groups in dispersed order, and this is perfectly correct. In our time we cannot remain content with the traditional tactics of the Cossacks. We must teach them the formations in close order and in general all that a troop of cavalry should know. For without this they cannot render the service expected of them in

war. The author is not among those who desire to see the Cossack regiments of the cavalry divisions withdrawn and removed from the influence of regular tactics. He believes on the contrary that the introduction of the Cossacks into these divisions has exercised a salutary effect on their usual methods, has contributed to their discipline and caused them to acquire valuable experience n a number of branches of military instruction.

Manœuvres in closed ranks are absolutely necessary even for Cossack troops and the more they are exercised in them the better. Only it is not in these manœuvres that we must seek the true sphere of the Cossacks but rather in movements in dispersed order. Hence in their regiments exercises in close order should take second place.

In a great European war the operations will commence with skirmishes where the Cossacks will find themselves from the first encounter in presence of regular cavalry mounted on large horses perfectly trained in the execution of impetuous and powerful shocks. The regular Russian cavalry, recruited and instructed according to the general European type, can and should contend with force and vigor against the enemy on these occasions.

But what resistance can the Cossacks oppose if they also venture to operate in close order as they are at present taught to do?

"There are indeed reasons of a wholly materjal kind which oppose our ever making a good regular cavalry out of the Cossacks, that is one capable of acting in close order by the power of shock; and this in spite of the fact that we now give them instruction exactly like that of the other cavalry regiments." In the first place they are mounted on small horses possessing valuable qualities for war but not noted for quickness of pace. Let us imagine a shock between a hostile cavalry provided with tall, powerful mounts and a regiment of Orenbourg Cossacks, for example, riding their little beasts with enormous heads, miserable appearance and thick hairy legs. The Cossacks would certainly have all the chances against them. And yet these same Orenbourg Cossacks with these same horses, hideous it is true, but capable of making their hundred versts* and more in twenty-four hours, could and should overcome such an adversary.

The second reason which prevents the Cossacks from contending on the same terms with regular cavalry is that they guide their horses simply by the snaffle. This system which presents many valuable advantages over that of the curb, does not, however, permit a troop to obtain that degree of accuracy and control of the pace necessary to combined action. Besides each Cossack trains his horse according to his own individual method, or without any method to speak more accurately. Their horses are in reality simply manageable, not trained, and a Cossack troop cannot attain the same degree of perfection in close order work as regular cavalry.

Finally every Cossack military organization rests essentially on the principle that each man brings into service his own horse, and that the regiments are formed on a purely territorial system. That is to say the men of the same *stanitsa*,† or group of *stanitsas*, always form the same unit.

*Sixty-six miles.

†Cossack village.

These two causes take away all possibility of assorting the horses. Thus one Cossack will have for mount a superb *machtak* of the steppes while his neighbor will ride an ordinary country horse. This defect in matching the horses and the impossibility of remedying it, absolutely prevents a Cossack troop from producing a shock in compact formation such as that given by regular cavalry mounted on horses as nearly alike as possible in size and training.

Let us add to all this the fact that, according to the organization in vogue, all the units which are on leave during peace, and which represent an effective double that of the units on active service, will find themselves, in case of mobilization, associated with Cossacks arriving at the point of assembly directly from their *stanitsas* mounted on horses taken from the pasture, emaciated by the winter and which have had only the time required to reach the theatre of operations for regaining their strength and training for work.

There is yet another reason why it would be impracticable to demand of the Cossacks, at least of those quotas* on leave, that they should charge boldly against regular cavalry, for the horses of the latter have been constantly fed on dry fodder and trained to shock action in compact order.

Such are the reasons, according to this Russian author, which will always prevent the transformation of the Cossacks into regular cavalry. He then criticises very justly the way they appear to be acting in Russia regarding the Cossacks, since, while leaving them in their primitive position, the authorities seem to ignore the material and moral conditions which surround them. All their military instruction, he says, is directed with a view to shock action in great masses, to which they are and always will be entirely unsuited, while those methods of action which naturally follow from their military organization are ignored. Thus the Cossacks are actually but little exercised to act in *lava* if we take this word in its true acceptation and not in the narrow sense of a simple mode of charging. They are no longer what they formerly were and yet have not become regular cavalry. A strange situation indeed and one with which it is proposed to do away. For it will produce among them what happened with the Turkish cavalry, formerly the terror of Europe, which lost all its value from the moment it became weighed down under the hand of "regularism."

The Cossacks may possibly have lost much of their native quality, but it cannot be doubted that they are yet superior to regular cavalry in individual combat. Otherwise we must place them with the baggage. If their horses are smaller and of less power, they are on the other hand more docile and nimble, and above all more even tempered and untiring.

Excellent in individual combat, the Cossack should fight in a formation which would give him the greatest space to move in, and to manage his weapons. And this formation is exactly that of the *lava* which should be considered as a special kind of manœuvre and not simply as a particular form of charge in dispersed order.

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* The Cossacks are divided into three "bans" or quotas of which one only is in active service during peace, the other two being on leave at their homes.

In former times the military experience of the Cossacks, acquired in their continual struggles against the frontier people, was transmitted by tradition from generation to generation. Each Cossack on entering service, came as a well-instructed soldier who continued, however, to perfect himself gradually by reason of his long term of service. But now that the military occupation of the Cossacks has become a thing of the past it is indispensable to give them direct military instruction. Only as we do not know exactly what we ought to teach them we are forced to give them simply the usual cavalry instruction. And yet these people have found and completely combined an excellent method of combat, perfectly appropriate to their moral faculties and to the material means at their disposal. This method of fighting is the *lava*, a method which it is impossible to assimilate with any form of regulations yet determined. And indeed it does not admit of regulation. For it has certainly lost its true significance in the minds of the Cossack people on account of the attempt to confine it within fixed rules. The methods of procedure in *lava* vary without limit according to the personality of the chiefs, the manner in which the enemy presents himself, the nature of the ground, etc. They are as complex as life itself, or as the fight, and will not submit to regulation.

But the Cossacks no longer possess more than a trace of information on this subject derived from war experience and it has become necessary to teach them this mode of action as methodically as we instruct regular cavalry in the close order attack.

In consequence of the loss of ideas derived from war experience the mode of action in the Cossack *lava* has come little by little to resemble the charge in dispersed order as foragers, and to-day it would be difficult to find any portion of Cossack troops who apply to the execution of *lavas* the rules practised in former times. This gradual disappearance of the peculiarities of action in *lava* has become more strongly emphasized since the Cossacks became incorporated in the cavalry divisions. Here they have come in contact with regulations rigorously suppressing the methods of attack in dispersed order, while on the other hand they do not possess clearly determined and worked-out forms of their own traditional mode of action. It is but natural that with time, and under the influence of such a state of things, the old methods of action in *lava* should have fallen little by little into neglect and should approximate more and more closely to the rules of the charge in dispersed order and that finally, throughout the whole body of Cossacks, the fundamental difference which formerly existed between these two entirely distinct modes of fighting has been lost so completely that there remains no trace of their diversity in the present practice. To form in one rank and throw themselves suddenly on the enemy, uttering the traditional *ghik*,* is all that remains of the old Cossack *lava*.

Now the real *lava* is quite another thing. It is in reality a special form of manœuvre intended to be employed against an enemy in compact formation in order to harass him, to exhaust him, to force him to break his ranks

* War-cry of the Cossacks.

or commit errors, and finally, at a favorable moment, to charge him resolutely with the sword.

In order to understand the character of the *lava* and show the error of confounding it with the charge as foragers, we will compare it with the latter as far as it is possible to make a comparison between things so different.

The *lava* is distinguished from the charge as foragers:—

1. By its essential character, for the *lava* is not a charge in the proper meaning of the word, but a form of manœuvre which terminates at any desired moment by a vigorous attack executed partly in dispersed order and partly in close order, or more exactly, in little irregular groups.

The charge as foragers, on the contrary, is simply a charge or movement directed towards the enemy in a very open formation which is adopted that the troops may suffer less from the enemy's fire, but has no other object than to arrive as quickly as possible at the point of attack. The duration of such a charge is never more than a few minutes, while the execution of a *lava* may take some hours.

The *lava* then is a manœuvre having for its object the preparation of a charge, while the charge as foragers is nothing more than a charge pure and simple.

2. According to the objective of the operation, the charge as foragers is, except in case of pursuit, employed only against artillery, infantry skirmishers and cavalry fighting on foot. Nothing can justify its employment against bodies of cavalry in close order, while this is exactly the case in which the *lava* can be used. It would not be expedient to use the *lava* against artillery, infantry or cavalry on foot as the Cossacks have for such cases the charge as foragers in which they are exercised as well as all Russian and other European cavalry. Against artillery, infantry skirmishers or cavalry on foot the Cossacks find themselves surrounded by the same conditions as regular cavalry and should attack in the same formation as the latter. Without doubt the *lava* can be used under certain circumstances in an attack on artillery or skirmishers, but this would amount simply to a charge as foragers in single instead of double rank. The Cossacks in *lava* form only in single rank.

3. The charge as foragers is executed upon the order of the troop-commander and under his direction. There is neither latitude nor initiative allowed either to the cavalrymen themselves or to the chiefs of platoon who must follow the movement in the positions indicated by the regulations. The *lava* ought not to be a simple mechanical arrangement of men in one rank. It admits of the division of the troop into a series of fractions acting in a great measure independently of each other, although influenced in a general way by the officer in command. And it leaves much room for initiative not only to the chiefs of the different fractions, but to each Cossack in particular.

The cavalry of Gengis-Khan and of Tamerlane as well as the old Cossack cavalry, were divided according to a decimal system and the subdivisions commanded by chiefs of ten, of fifty, of a hundred and of a thousand. The system was based on a movement by tens.

4. Shooting from horseback in a charge as foragers against artillery, infantry or cavalry on foot is a mistake; but the shooting of a *lava* in its action against an enemy's troops in close order should be practised on a large scale during the preparatory period, that is to say, during the *lava* manœuvre.

The light cavalry of all nations of horsemen, like those of Gengis-Khan and of Tamerlane, always shot with their bows when acting in *lavas*. Each cavalryman carried ten arrows while the footmen had thirty. Why should not the Cossacks of the present day, who have excellent carbines use them when they manœuvre in the same fashion?

The comparison which we have just made between the *lava* and the charge as foragers shows them to be entirely different and that they have not, so to speak, even a common measure.

What prevents a proper understanding of the peculiarities and character of the attack in *lava* is perhaps the word itself which many persons are prompted to interpret as signifying volcanic lava with its irresistible movement, overwhelming everything in its way. We will endeavor to give an explanation of the word without however guaranteeing its entire correctness.

The word lava appears to be of Eastern origin. In the old Mogul tongue there existed the word "laou" which expressed the idea of an effort exerted from a circumference towards a centre or from various points of a position in dispersed order towards a single point, a single object. And as the mode of action in *lava* came from the East it is natural to suppose that the name came from there also.

The ordinary signification of the word lava, when employed in speaking of material in a state of fusion overflowing from a volcanic crater, contains the idea of a linear movement from a centre towards its circumference or at least of a linear movement in advance, while the essential character of the *lava* is quite the reverse of this and agrees more nearly with the idea conveyed by the word "laou" given above. There is then no similarity of origin between these two terms.

Regular cavalry is strong in shock action, when in compact formation, but feeble in individual combat. The Cossacks on the contrary are strong in this last quality but feeble in the first, for the reasons already given.

One of the strongest assurances of success in war consists in avoiding the blows which an enemy can deliver with advantage and attacking him at a weak point. This is the principle on which the Cossacks acted during the war of 1812 against the French. Understanding clearly the difficulty of contending against cavalry in close order, the power of whose shock would have broken their ranks, they carefully avoided giving opportunities for such attacks. To insure this they dispersed in *lava* and began to prepare their own attack so that later, when circumstances appeared favorable, they might pounce upon the enemy sabre in hand. Thus they practised all kinds of strategems and manœuvres in order to force the enemy to open out, to scatter, to lead him into ambuscades or to cause him to fall under the blows of the regular Russian cavalry. Here everything depended upon imagination,

boldness and initiative, not only on the part of the subaltern chiefs but on the simple Cossacks as well.

The action in *lava*, terminating at a favorable moment by an energetic attack, appears to resemble in many ways a fight logically and regularly carried out. The regular attack is prepared by artillery and infantry fire in order to inflict material losses and demoralize the enemy, after which the charge or shock finishes the fight. Similarly with the Cossacks, the manœuvre in *lava* is the preparation for the shock and the subsequent attack is the shock itself.

Let us consider these two phases.

What disposition does regular cavalry make to prepare its attack? Hardly any at all. We are speaking of cavalry alone, without artillery. The essential character of the cavalry fight does not admit of a preparatory period but only of the final act, that is to say, the attack, the charge. It pertains to the cavalry rôle either to make a sacrifice by throwing itself headlong upon the enemy when, at any price, it is a question of saving itself or other troops, or to watch for a favorable moment to attack. Hence the dependence of cavalry upon the other arms which prevents its acting alone, while its instant attack has given it the name of "arm of the moment."

A *lava* consists of a line of Cossack cavalrymen disposed at three or four paces apart, so that the length of a *lava* formed by a sotnia* is about equal to three times the front of this same unit in deployed line.

Behind this line at some distance the guidon of the sotnia is carried at the end of a long pole by means of which the chief, who cannot direct the *lava* by voice, gives the signals for executing such movements as he may desire.

By reason of its great length, it is easy for the *lava* to act against the flanks or even the rear of an adversary, and on account of the thin line presented, the shocks in close order do no harm for it avoids them.

Let us imagine a squadron of regular cavalry in close order opposed to a sotnia in *lava*.

What will they try first? Three methods present themselves: 1. Shock action in close order; 2. An attack as foragers; 3. Fire-action on foot.

Take the first case and suppose that in order to get at the Cossacks, the squadron throws itself against their centre with the idea of piercing it. The Cossacks avoid the shock and commence to fall back, increasing their intervals. The squadron soon finds itself enveloped on both flanks, even without a manœuvre on the part of the Cossacks, and the more energetically they pursue this course the more completely will they be surrounded.

Seeing finally that in pursuing single cavalrymen he obtains no resulting benefit, the enemy returns and directs his energy against the flanks of the *lava* from which the Cossacks are firing upon him without dismounting. As he approaches, the latter fall back fighting in retreat while others at a gallop fire upon him in flank and rear. At the same time the Cossacks from the centre of the *lava*, who at first had retreated before the charge of the

* Cossack squadron.

squadron, and those of the opposite flank come up firing with their carbines and continually threaten to charge at the slightest show of negligence.

After charging in this way at nothing several times, and without accomplishing anything except to expose itself to a galling fire, the squadron begins to lose confidence and ends by feeling powerless to cope with its enemy. From this moment its fate is sealed. For the more it struggles, the more will the Cossacks weary and demoralize it, until, having thus well prepared the attack, they charge in with lance or sword.

But suppose that the enemy, tired of chasing after Cossacks in close order without results, decides to charge as foragers on the *lava*. In taking this resolution he deprives himself of his main element of strength and presents his weak side by allowing himself to be drawn into an individual combat where the Cossacks should have a decided superiority. The action ends with the same blow as before and the Cossacks should, without waiting, engage with the lance or sabre.

Finally, suppose that the squadron profiting by some accident of ground, decides to oppose the *lava* by a fire-action on foot. The Cossacks then advance with the sabre, seizing that moment when the enemy has just put foot to earth, or they can charge the horse holders or dismount themselves when local circumstances permit this to be done.

The conditions of a fight between a squadron and a sotnia in *lava* are exactly similar when the numbers engaged are greater. For if the opposing cavalry is formed in two lines or in échelon, the *lava* also can form in échelon in the same manner or so dispose columns as to protect one or both its flanks.

The *lava* is thus found to be an excellent method of opposing regular cavalry who have no means of contending against it with success. And, moreover, it is not necessary that each Cossack should be endowed with exceptional bravery and audacity, since all find themselves, by the simple fact of this arrangement, in relative security which naturally inspires boldness.

It was thus, during the war of 1812, that the Cossacks came circling about just in front of the French whom they fired upon almost at point blank with their great muskets of the period.

Military Notes.

MILITARY BALLOONING.

AT the Royal United Service Institution an instructive paper on "Military Ballooning" was read by H. B. Jones, Lieutenant, R. E.

The three gases, he observed, that are available for inflating a balloon are hot air, coal gas, and hydrogen. Hot air is practically out of the question. Coal gas has a lifting power of about 35 lbs. per 1000 cubic feet. Hydrogen is a much more costly gas, but its lifting power is from 60 to 68 lbs. per 1000 cubic feet, and therefore for military purposes, where economy in transport is of the highest importance, it is very valuable. The cubic capacity of the normal English war balloon is 10,000 cubic feet; the French use a balloon of 19,000 cubic feet. The English were the first to adopt the plan of carrying the gas ready made. Each gas tube weighs about 70 lbs., and carries 120 cubic feet of hydrogen. Four wagons carry 140 tubes, or an equivalent of about 17,000 cubic feet of hydrogen, and the total weight, including wagons, is about 9 tons. The alternative mothod of carrying the materials and plant for making the hydrogen involves the transport of about 2 tons of material. Sulphuric acid, being besides awkward stuff to handle, would require a specially constructed cart for its transport. In addition to this weight there is the weight of the generators and other plant for making, washing, and cleaning the gas, and the weight of the wagons themselves; and, taking everything into consideration, it seems that, at least for the first 20,000 cubic feet of gas, it is easier to carry it compressed.

The following are the chief advantages of the system of carrying the gas compressed: 1. Rapidity of Filling. With the normal English war balloon, the whole process of preparing the balloon for an ascent takes from fifteen to twenty minutes, but, if the gas had to be made on the spot, it would take about four hours. 2. Purity. During the process of compression a great proportion of the impurities in the gas are got rid of, and a gas with higher lifting power is thus obtained. 3. It is not necessary, as in making the gas, to be close to a stream or river. 4. There is always a daily loss of gas, which is easily made up by putting in a tube of gas; but if the gas has to be specially manufactured, it may cause considerable delay. Against the system of steel tubes there is the fact that they may be destroyed by the enemy's fire while on the march, and that it is necessary to keep up a supply of full tubes from the base to take the place of the empty tubes, and a pumping station must either be fitted up at the base, or a good supply of loaded tubes taken out from England.

The wind is the great enemy of captive ballooning, but it is precisely captive ballooning which is most useful for military purposes. For the material of the envelope, silk coated with certain varnish has been adopted by the French. The Germans use a cotton material coated with india-rubber; we use a different material, which gives very good results, but which Lieutenant Jones was not at liberty to discuss. In the balloon, after duly considering safety, everything else has to give way to the question of weight. As already mentioned, the size of the normal English military balloon is 10,000 cubic feet, and, as hydrogen lifts about 65 lbs. per 1000 cubic feet, this represents a total lift of 650 lbs. Two very light men weigh, say, 280 lbs. The balloon must be able to take up at least 1500 feet of rope, weighing, say, 100 lbs., and, therefore, there remains only 270 lbs. for the weight of the balloon and its fittings and for the buoyancy required to make it rise and withstand the force of the wind.

The rope adopted by our Army answers the double purpose of a guy rope and a means of communication. It is made of steel wire in seven strands, each strand consisting of twelve wires and a string core; in the centre of the rope there is an insulated wire for telephone work. The circumference is ⅞ inch, and breaking strain one ton; the weight is rather over one ounce per foot. The wire itself acts as the return wire for the telephone.

On April 1, 1890, the formation of a balloon depot and section was sanctioned, and the numbers were as follows:—Balloon Depot—One instructor in ballooning, one military mechanist, one Engineer clerk, six other ranks. Balloon Section—One captain, two lieutenants, one company sergeant-major, one sergeant, twenty-three other ranks. The transport of the section consists of six wagons, each requiring four horses. They comprise one balloon wagon, four tube wagons, one general service wagon. All these wagons are converted from general service wagons to avoid special fittings as much as possible. The balloon wagon carries at the tail of the wagon a drum on which is wound 2500 feet of wire rope; the drum is fitted with a strong brake, and with handles at each side for winding in the rope; the telephone connections are carried from the drum to a box in which are the telephones. The balloon wagon in foreign equipments carries a small vertical engine, and the rope is run off or wound up by machinery; this makes the wagon very heavy, and we find that steam power is not necessary. Our balloon wagon can carry twelve men if required. The tube wagons carry the supply of gas for the balloon. The tubes are made of mild steel; they are 8 feet long, 5⅜ inches in diameter, and ⅛ inch thick; their cubic capacity is 1 cubic foot, and they are loaded in peace-time at a pressure of 1500 pounds to the square inch or 100 atmospheres, so that each tube carries 100 cubic feet of gas. In war-time the pressure is increased to 1800 pounds or 120 atmospheres, and each tube carries 120 feet of gas. The average weight of a tube is 70 pounds. The weight of a loaded wagon is 43 cwt.

The tubes are in no way dependent on the tube-wagons; the balloon can be filled from tubes arranged on the ground, or the tubes may be carried in ordinary carts or slung on camels or other pack animals. It is most im-

portant to have a good valve for the tubes, and this has been obtained; the outflow of gas can be regulated with the greatest nicety, and during the operations in Bechuanaland and Egypt it is believed there was not a single case of leakage from the tubes. The general service wagon is of the usual pattern, and carries all the reserve stores, the most important being a spare balloon and a spare coil of the steel wire rope. Although fully equipped with wagons, the Balloon Section at present possesses no horses; these during peace-time are supplied by the field depots and other mounted units of the Royal Engineers at Aldershot.

On roads where telegraph wires and trees are frequent the balloon is towed by two ropes, which can be fastened to the drum on the balloon wagon till an obstacle is reached. If this is a telegraph line or similar obstacle, the object is to hold the balloon with one rope while the other is got over the wire. Plenty of practice is required to carry out these operations smartly in a wind, and it speaks well for the sappers in the Balloon Section that in three summers' work at Aldershot the only damage done was that on one occasion two wires were put in contact for ten minutes.

It is most important to insure prompt communication between the balloon and the ground, and this is got by using the telephone, the wire for which runs through the main wire rope; the distance is never much over 500 yards, and by using the Siemens-Halski patent the necessity of a battery is avoided. A very convenient method of sending messages and plans from the balloon is by aid of a small canvas bag which is weighted and provided with a split ring at one corner; the message is put in the bag and the ring run round the rope, and the weight of the bag makes it run down the rope to the ground.

It is a very common error to assume that, because the balloon is a good place to reconnoitre from, that therefore to send good reports from a balloon is a very easy matter. It seems ridiculous that any one should take a company for a battalion or Transport wagons for field-guns, but both mistakes can easily be made. The observer must be fully acquainted with the formations and tactics of all arms of the Service to avoid sending useless and misleading reports. For a report of an enemy's movements to be of use it must arrive in time for his opponent to be able to take steps to meet the emergency; the report must, therefore, be put as concisely as possible, and the time at which the message is written must be stated; a rough sketch, showing troops with colored chalks, is frequently much more useful and quicker done than any message, but it has the disadvantage that it cannot be sent to the general except by a messenger. Arrangements must be made for the quick transmission of reports from the balloon wagon; these can be sent very quickly if a cable cart of the Telegraph Battalion is available; if not, mounted orderlies have to be used.

The great use of balloons in the field is in supplying information as to the disposition of the enemy's force before the engagement commences and giving details as to the position of his camp. That during the fight itself the balloon may be of the greatest service when large bodies of troops are engaged is undoubtedly true, and is borne out by the fact that, during the last French manœuvres, General Gallifet, who commanded one side, re-

mained in the balloon the whole time, and sent orders down to his staff by telephone. Even the opponents of ballooning allow that a balloon may be of the greatest assistance in correcting artillery fire, describing its effects, and giving particulars as to the construction of the various works, constructed or being constructed. If a battery is firing at an unseen target, the system of observing fire by any means but a balloon would be impossible in many cases.

As to the effect of fire on balloons, the result of the last experiment at Lydd was that the balloon was not hit until the seventeenth shot; while falling it was again struck by another round of shrapnel, but fell quite slowly, and there would have been no appreciable shock. The damage done consisted of two tears from the fragments of shell and various bullet holes through the envelope, and the car had two bullet holes through it. The balloon could have been rendered fit for use again in about two hours. A balloon should never be allowed, if possible, within the effective range of infantry fire, and taking all things into consideration, it appears that about two miles is about the minimum distance at which it should be kept from artillery; one great point in the balloon's favor is the difficulty of getting its range, and to avoid any assistance being given the balloon wagon should always be well under cover.

Lieut. Jones then briefly referred to military ballooning in foreign armies, and observed in conclusion that, although we have succeeded in obtaining a good portable balloon equipment, and can say that we have been the pioneers of the compressed gas system, there is still much room for improvement.

RECENT MILITARY ARTICLES OF SPECIAL INTEREST.

"The German Army of To-day." By Lieutenant-Colonel Exner. *Harper's New Monthly Magazine, May*, 1892.

"The Austro-Hungarian Army." By F. Z. M. Baron von Kuhn. *Harper's* for June.

"Sea-Coast Guns and Steel Armor." By First Lieutenant E. M. Weaver R. Q. M., 2d Artillery. *Journal of the United States Artillery.*

"Military Ballooning." By Lieutenant H. B. Jones, R. E. *Journal Royal United Service Institution*, March.

"Field Howitzers and Mortars." By Lieutenant-Colonel H. L. Walford, R. A. *Journal Royal United Service Institution*, June.

"Field Artillery Fire." By Captain W. L. White, R. A.

"Notes of Lectures on Artillery in Coast Defense." By Major A. C. Hansard, R. A. *Proceedings of the Royal Artillery Institution*, May and June, 1892.

"The Shoeing of Army Horses, Ancient and Modern." By George Fleming, C. B. *United Service Magazine*, London, June.

Reviews and Exchanges.

The Memoirs of Baron de Marbot.*

THE English version of Marbot's memoirs will be welcomed by a very large class of readers to whom the original is not accessible. Everybody who loves adventure, young and old, will find stimulating interest in one of the most adventurous of lives. No soldier could serve, as he did, in the whole of the great campaigns of Europe from the beginning of the French Consulate to the catastrophe at Waterloo, without being part of a romance beyond any fiction. But Marbot had an exceptional experience even for that wonderful time. He seemed to be in the thick of every engagement, and at every point where the military excitement reached its climax. His wounds were visible tokens of participation in battles that are world-famous, and made him conspicuous by their number at a time when such brevets of military distinction were common. It grew to be a proverb among his comrades that if any one was hit, it was sure to be Marbot. He was, however, peculiarly fortunate in this, that though many of his wounds were severe, they did not cripple or mutilate him, and he recovered from them to seek fresh service at the front and to face new dangers with spirits as high and courage as unbroken as in his first campaign.

His intelligence and attractive qualities of mind and person marked him early for staff duty, and he was brought into intimate relations with an extraordinary number of the marshals of the Empire. He thus came to know these great soldiers as few others could know them, and his anecdotes of service throw strong light on the character, in turn, of Masséna, Bernadotte, Augereau, Lannes, and Napoleon himself. He had scarcely less thorough opportunity to know Murat, Ney, Junot, Bessières, Oudinot and Gouvion St. Cyr. As to each of these, some trait of character is brought out in the most instructive of all ways, by letting us see how they spoke and acted on the field, around the camp fire, and in the more intimate personal relations of life.

The trustworthiness of Marbot as a chronicler impresses itself strongly on the reader. He was kindly disposed to others, and has nothing cynical or envious in his composition, so that his judgments of men will command full weight in estimating them. He is not given to exaggeration, though some of his own adventures border on the incredible. Wherever we have the means of testing his accuracy, he stands the ordeal well, and has thus a claim to credence when we must depend on him alone. This may be illustrated by a comparision of his account of a single incident with the story as given in another famous book, that of Captain Coignet. The latter was a true type of Bonaparte's *grognards*—the soldiers of the old guard—and was originally an illiterate peasant who, by daring and long service, gained his commission. He means

* *The Memoirs of Baron de Marbot*, late Lieutenant-General in the French Army. Translated from the French by Arthur John Butler, late Fellow of Trinity College, Cambridge. In two volumes, 8vo, with portraits and maps. Longmans, Green and Co., London and New York.

to give us, in his *cahiers*, a true story of his military life, but the "brag" of the camp and the love of making the listener open his eyes, are seen through the whole. Marbot, on the other hand, was an educated man who knew the world, and who tempered his stories by the knowledge that his words would sooner or later be brought to book. Both were at the opening of the Russian campaign in 1812, and both witnessed the storm which burst upon the French army soon after it crossed the frontier, and which later, to those who looked back on the campaign after the retreat from Moscow, seemed like a supernatural portent.

It was near the end of June and in a latitude where summer heats are often intense. Coignet describes it as so fierce a tempest of hail and snow as to make one feel in advance the horrors of the next winter. He says, "what an awful spectacle in the morning! In the cavalry camp near us, the ground was covered with horses *dead with cold!* More than ten thousand died in that night of horror." He tells us also of soldiers found dead upon the road "not having been able to survive the monstrous storm."

Marbot's narrative excludes the miraculous and reduces all to intelligible proportions. "The heat had been stifling. It brought on toward evening a frightful storm, and a deluge of rain inundated roads and fields for a circuit of fifty leagues. * * * The storm having greatly lowered the temperature, our horses in the bivouacs suffered the more that they had to eat water-soaked green fodder, and lie down in the mud. The army, consequently, lost several thousand by acute colic."

We see here precisely the difference between a natural event, imposing and terrible it is true, and one exaggerated into a form which we find in ancient myths and legends. It is this difference which makes Coignet's a story which we read with endless amusement but with a conscious discounting of the improbabilities, whilst we follow Marbot with the growing conviction that he is a witness who may be trusted, and who instructs while he entertains us.

This combination of merits makes Marbot's memoirs a most important contribution to military history as well as a fascinating record of a soldier's personal life. He was not in so high command as to make his memoirs, like Marmont's, a controversial defense of his campaigns and of his generalship. Yet he had rank enough to bring him within the circle of those who knew the inner motives of events, and to make even his casual utterances useful in correcting our judgment and perfecting our knowledge of those times.

The translation is a lively one, in racy English, free from any slavish literalness, whilst it gives, in general, the true spirit of the original. If there be any fault, it is perhaps, in a too constant effort to render the colloquialisms by English equivalents of our own day, which would have hardly passed current with Englishmen of 1815, and which approach at times more closely to slang than is consistent with Marbot's style and manner. It may be questioned whether the Norman peasant soldier's "*Dam—il faut vouer*" (vol. 1, p. 339) is *translated* by "Well zur, us shall zee," though the English rusticism may cleverly indicate the relations of the speakers. It is also amusingly noticeable that in his next speech the Norman forgets his z's and talks good English. One of the very few slips in translation which we have noticed is in the story of the thunder storm already mentioned, where the colic is made to carry off the soldiers instead of the horses.

Taken as a whole, it is rarely the case that the English reader has the means of entering so fully into the enjoyment of a book in another tongue, and it is safe to predict that very many will enjoy Marbot. The three volumes of the original are condensed into two; but this has been done by a judicious selection of the parts which would bear contraction, having all the important and characteristic experiences of the

author in the full detail which he gave them. The portraits are reproductions of those in the original work, one showing Marbot at thirty and the other in the latter part of his life. Well engraved maps of Central Europe and the Spanish peninsula have been added, as well as smaller sketch maps of some of the great battles. The typography and press work leave nothing to desire, so that the work will be a welcome addition to any library.

J. D. Cox, LL.D.,
Major-General, U. S. V.

Personal Recollections of the War of the Rebellion.*

This collection, well edited and handsomely printed, will be a satisfaction to those who, like the members of the New York Commandery of the Loyal Legion, have a personal interest in the author, and it will serve as a monument to the various talents of that body of veterans—scholarship and wit as well as soldiership. Such names as Sherman, Hayes, Howard, Walker and Porter amongst its contributors would alone suffice to give it value to the general reader.

It is not possible to review the book as if it were a connected work. Its essays have no other relation to each other than that of relating to the War of the Rebellion, and they compass the extremes in literary merit as well as in the character of their subjects.

The papers on Grant, Thomas, Hancock and Ransom are graceful and sympathetic tributes from men to whom the world willingly listens upon these themes. Porter's summary of Grant's career in statesmanship will be a revelation to many, and Walker's description of Hancock brings out a feature in the career of that brilliant general which few have thought of in connection with the splendor of his achievements in battle, and that is the carefulness of his preparation for everything which called for action. It is a new illustration of the fact that the road which genius pursues to success is usually paved with hard work.

There is historical value in the accounts of the naval actions at Forts Jackson and St. Phillip (erroneously called "Pillow" in the index) and Vicksburg, and the conflict between the *Sassacus* and the *Albemarle*. The story of this latter fight is told with the vigor of a Marryat. The combat was as close as those at Trafalgar and the narrative of it stirs one like the stories of the exploits of Nelson and Benbow. The account of the Red River dam is very clear. It cannot fail to be of interest to engineers and it records perhaps the most illustrious example of the genius for overcoming physical obstacles which pervaded our army.

The description of the siege and capture of Plymouth is as minute as Kinglake's Crimea in which single combats of private soldiers have place with the action of divisions. The detailed account of the part taken by the members of one regiment, taken in connection with the report of the commander of the Union forces that his loss in killed and wounded out of 3000 men in three days fighting was not over 150, gives the impression that the fame of this regiment is the burden of the author's labors.

In the Fruition of the Ordinance of 1787 we find a careful and philosophical examination into the sources of history. The author reads between the lines of the record to find the evidence that the soldiers of the Revolution who aided the colonization of the Northwest were active participants in the legal exclusion of slavery from that great territory, from which grew the momentous consequences culminating in the Civil War. The accounts of the trial of the conspirators against the lives of Lincoln

**Personal Recollections of the War of the Rebellion.* Edited by James Grant Wilson and Titus Munson Crane, M. D. Published by the Commandery, New York, 1891.

and Seward bear the impress of judicial fairness and are valuable contributions to the history of this great tragedy.

The leading number in the book is entitled "Gettysburg," but its subject is really the conduct of General Sickles in that battle. The author advances a new argument in the discussion as to the propriety of the advance of the Third Corps to the peach orchard. On the morning of July 2d, 1863, the line of the Second Corps extended southward from Cemetery Hill along Cemetery Ridge in such a direction that if prolonged about a mile farther it would have crossed the two hills on the left flank of the Union position called the Round Tops. Sickles was directed to form his corps on the left of the Second Corps in continuation of its line, and during the morning he placed one of his divisions (Birney's) on this prolongation in line of battle extending directly from the left of the Second Corps to Little Round Top and massed the other (Humphreys') near by. His line near Little Round Top rested on ground which was lower than the ground half a mile in front along the Emmetsburg road. At about 2 P. M. Sickles occupied the high ground on the Emmetsburg road by throwing Birney's division forward about five hundred yards and then wheeling it to the left nearly at right angles with the line relinquished. This allowed the left flank to still rest at or near Little Round Top, but left the right flank in the air at the peach orchard towards the enemy. Humphreys' division was thrown forward from half to three quarters of a mile to connect with his right flank and was deployed on a line nearly parallel with that originally held by Birney, so that its right flank was half to three quarters of a mile in front of the left flank of the Second Corps.

In this new formation Sickles' corps projected out in a salient like two sides of a triangle with the point towards the enemy. The corps was about 12,000 strong. The new line occupied by it was something less than two miles long. Two brigades were held in reserve. If the whole corps had been prolonged on the original line it would have extended across both Round Tops. All of the army agree that it was important to hold these hills to protect the left flank. The writer of the article under review advances the new proposition that Sickles threw his corps forward in the position above indicated because he saw that the enemy were massing in his front to attack our left flank, and "this movement would at once compel the enemy to develop his plan of attack as our position there menaced any attempt he might make at turning our flank, and in fact compelled him to attack us or suspend his movement and await our attack." It is not quite clear whether it is meant that Sickles' movement compelled the enemy to attack before they had intended to or not, but the record would not sustain that assertion because it shows that Lee's troops had already been laboring for hours to get into position to attack, and it did not require Sickles' movement to either prompt or accelerate this intention. Neither is it apparent that the movement diminished the alternatives which were open to Lee before it was made, for at that time he also was free to attack or to suspend his movement and await our attack. A deeper purpose is attributed to Sickles than he claimed for himself before the Committee on the Conduct of the War, where he says: "I took up that line because it enabled me to hold commanding ground, which, if the enemy had been allowed to take—as they would have taken it if I had not occupied it in force—would have rendered our position on the left untenable." He makes no doubt that this was within his instructions, and in fact nothing in the record shows that he had been ordered to continue the line from the left of the 2d Corps in a right line to Little Round Top, or that it was not within his discretion to deflect it, still leaving his left to rest on Round Top. It is true that in advancing his right from half to three-quarters of a mile in front of the 2d Corps he seemed to depart from his orders, and in doing this he gave the enemy the chance to strike this right flank and so involved the corps in a worse catastrophe than that which

resulted from the attack on his left; but they did not attack the right flank, and probably nothing damaging actually resulted from this break in the connection with the 2d Corps. General Meade in his testimony before the Committee on the Conduct of the War while saying that Sickles' advanced line was not that which he had intended he should take, did not say that Sickles in taking it had exceeded his authority. He said: "I had sent instructions in the morning to General Sickles, commanding the 3d Corps, directing him to form his corps in line of battle on the left of the 2d Corps, commanded by General Hancock, and I had indicated to him in general terms that his right was to rest upon Hancock's left, and his left was to extend to the Round Top mountain, plainly visible, if it was practicable to occupy it," and he concluded his comments on Sickles' movement as follows. "It is not my intention in these remarks to cast any censure upon General Sickles. I am of the opinion that General Sickles did what he thought was for the best, but I differed with him in judgment and I maintain that subsequent events proved that my judgment was correct and his judgment was wrong." There can be no question that Sickles took the courageous and resolute part in moving his line to the front, but the fact that on the next day the Union line occupied the very position from Cemetery Ridge to Round Top which he abandoned as untenable, and the enemy at the same time occupied the ground which he regarded as commanding, would seem to show that his opinion was not well founded. It cannot be forgotten that it was obvious to him that in moving forward he gave up the opportunity to run his line across the Round Tops which were essential to the Union position.

The writer of the article under review inveighs against Meade for fearing attacks on his right which the writer says was never intended, and neglecting to provide against one on the left notwithstanding Sickles' warnings, until it actually began.

Lee says in his report of July 31, 1863, that Longstreet was directed to try to carry the left "while General Ewell attacked directly the high ground on the enemy's right" and in his report of Jan. 20, 1864, he said "General Ewell was instructed to make a simultaneous demonstration upon the enemy's right, to be converted into a real attack should the opportunity offer." Sykes commanding the 5th Corps under Meade says that in the morning he took position on the right—but was withdrawn and massed near the bridge over Rock Creek and he adds: "While thus situated I was directed to support the Third Corps, General Sickles commanding, with a brigade should it be required. At 3 P. M. General Meade sent for me and while myself and other corps commanders were conversing with him the enemy formed, opened the battle and developed the attack on our left. I was at once ordered to throw my whole corps to that point and hold it at all hazards. This of course relieved my troops from any call from the commander of the 3d Corps. *En route* to the position thus assigned the Fifth Corps various staff officers from General Sickles met me and in the name of that officer asked for assistance. I explained to them that it was impossible for me to give it, the key of the battle-field was intrusted to my keeping, and I could not and would not jeopardize it by a division of my forces." The writer under review says that while the Third Corps was hard pressed Sykes excused himself from reinforcing it because his men were tired, and that his corps did not move until the enemy had broken and rolled up Sickles' line, which was after 5.15 P. M. Turning to the Official Record we find in the reports of the division and brigade commanders that they received orders to move into action from 4 to 5 P. M., and that they at once moved to the front. The writer also says that it was by accident or through Providence that Warren arrived on Round Top and discovered the march of the enemy on that point in time to call troops there. Warren testified before the Committee on the Conduct of the War, that he was sent there by Meade after they had visited Sickles' advanced position.

The writer seems to think that it was the delay consequent upon the attack upon Sickles being forced upon the enemy, which gave the time for the Fifth Corps to occupy Round Top, but he makes no allusion to the possibility that if Sickles' original line had lain across the Round Top, Hood's attack upon that point would have been repulsed without the preliminary shattering which was inflicted on the Third Corps. This of course is upon the assumption that this corps could have held its line in the low ground against the enemy on the high ground on the Emmetsburg road. In fact the whole question whether Sickles' advance was wise or unwise hinges upon this.

Such articles as "Gettysburg" are useful for evolving discussion, but they do not aid much in the solution of questions for history.

THOMAS L. LIVERMORE,
Colonel, U. S. V.

History of the Nineteenth Army Corps.

The campaigns, marches and sieges of the various Army Corps of the Union Army which fought in Virginia and in the West, and from Atlanta to the sea, were fully chronicled in the newspapers and current literature of that date and have given employment to many pens from that time even to the present day. But in one far-off, detached corner of our country, a single Army Corps fought, bled and suffered, concerning whose operations very little was known at the time and comparatively little has been written since.

The History of the Nineteenth Army Corps, by Lieutenant-Colonel Richard B. Irwin, formerly Assistant Adjutant General of the Department of the Gulf and of the Nineteenth Army Corps, in part fills this void in the history of the war.

The particulars of the occupation of New Orleans in May, 1862, were generally known, but the subsequent campaigns of the troops who were sent there at that time and subsequently, have been so overshadowed by the weightier and more momentous events occurring nearer home,—nearer the Northern States,—that they have received but little attention.

General B. F. Butler commanded the original expeditionary force which occupied New Orleans, and as Colonel Irwin confines his account strictly to the military history of this force, he does not mention the civil administration of the city by its chief, which made New Orleans in a short time one of the most orderly as well as one of the healthiest cities on the continent, and its ruler's name more widely known, for a time, than that of any other American general.

General Butler was succeeded by General N. P. Banks in December, 1862, and in the same month the force originally under Butler, combined with the large reinforcements brought with him by Banks, were regularly organized into the Nineteenth Army Corps.

The Teche campaign, followed by the investment, siege and capture of Port Hudson, took place in 1863; and the Red River campaign, in which our troops marched up the hill and then marched down again, as did the French king of old, occurred in 1864. The malarious swamps of Louisiana were from the beginning more deadly to our men than the bullets of the enemy. Hardly one in three of those who invested Port Hudson were well men when it surrendered.

In July, 1864, however, the 1st and 2d Divisions (which henceforth constituted the 19th Corps) were sent North, arriving just in time to take part in the defense of Washington when it was threatened by Early. The Shenandoah Valley was henceforth to

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* *History of the Nineteenth Army Corps.* By Richard B. Irwin, Colonel U. S. V. G. P. Putnam's Sons, New York, 1892.

be the scene of its operations, and in all the battles occurring there the 19th Corps did its duty well and thoroughly.

It is fortunate in having for its historian the gallant gentleman whose work, just issued, is the final achievement of a life spent in loyal service to his country and his fellow men.

It is a clear, well-written and well-printed history of the Corps, interesting to the general reader, and intensely so to those who helped to make it.

There is no blot upon the record. Many victories and some reverses are chronicled. The latter must be expected when brave men meet those equally brave, but never was honor lost. No Corps of the Union Army can show a better record of duty well and steadfastly performed, and of suffering and loss endured with unfaltering courage. To quote the final words of Colonel Irwin :—" When at last the final separation came, and little by little the old Corps fell apart, every man, as with inexpressible yearning he turned his face homeward, bore with him, as the richest heritage of his children and his children's children, the proud consciousness of duty done." W. L. H.

Seats and Saddles.*

This work was first given to the public more than twenty years ago, and its re publication through numerous editions fairly entitles it to rank as a classic. Since its first appearance various writers have had much to say on the subjects of which it treats, but have added practically nothing to the information so lucidly and attractively presented by this gifted author. Not the least merit of the work is its condensed and graphic style of illustration and argument by means of which the subjects of seats and saddles, bits and bitting, draught and harness and the cure and prevention of restiveness are exhaustively treated within the compass of a small and handy volume of about three hundred pages. The awakening of thought and interest incident to the adoption of our new drill regulations renders the appearance of this American edition of the work most opportune, and no cavalry or artillery officer can afford to be ignorant of its contents. The book has not, however, been written solely for professional readers, but will be found useful and interesting to all who make use of horses for business or pleasure.

The introductory chapter gives a rapid sketch of the various styles of riding, national and individual ; calls attention to the mistakes that are made in the adjustment of the burden to the framework of the horse and the many evils resulting therefrom ; indicates the uses of the bit and the necessity of its accurate adaptation to the purpose of transmitting the will of the rider to the horse, and, in fact, outlines the general plan and scope of the work.

Part one is devoted to seats and saddles. The framework of the horse is considered from a mechanical point of view. The two centres of gravity and motion are pointed out, and the fact demonstrated that the relative positions of these two centres may be adjusted by simply altering the position of the head and neck. The points emphasized with reference to the saddle are : that the size should be proportioned to the burden to be carried, that the under surface, as regards shape, should be fitted to the horse's back as a mould is to the cast that is taken from it, that the girth should be attached to its middle point, and that it should be so placed that the weight which it carries will be over the centre of motion, *i. e.*, the fourteenth vertebra. The rule for seats is stated to be : " The saddle in the centre of the horse's back ; the girths, stirrups and rider in the centre of the saddle." The whole subject of seats, as adapted to

* *Seats and Saddles, Bits and Bitting.* By Francis Dwyer, Major of Hussars. United States Book Co. : New York, 1892. $1.50.

the various purposes of war and peace, is exhaustively discussed. Those cavalry officers who are disposed to believe that all the difficulties incident to correct saddling have been overcome by the use of our regulation saddle with its hair cincha and latigo strap may, perhaps, after a perusal of this portion of the book begin to doubt whether the problem of the harmonious adjustment of the variable quantities of rider, horse, and pack, with the constant quantity of an inflexible saddle is, after all, as simple as it looks.

The second part treats of bits and bitting. The horse's head and neck are considered as levers by means of which the animal may be steered like a boat by the tiller, and the value of correct bitting as a preventive of restiveness is shown. The varieties of shapes of horses' heads and necks and the different conformations of mouths, tongues, chins, lips and chin-grooves are considered, and the fact fully demonstrated that there is no model or size of bit that is suited to all horses, but that each horse presents a separate problem for study in this regard. The different forms and uses of the cavesson, snaffle, training-halter, running-reins, etc., are shown, and the mechanical principles of the curb and other bits fully discussed. Instruments that have been devised for taking correct measurements of the horse's mouth are described and their uses explained. Most cavalry officers will read these chapters with feelings of mingled satisfaction and disgust. Satisfaction in recognizing through the lucid demonstrations of the author the true principles upon which bits should be constructed and applied, and disgust when the character of the bit now issued, and the apparent remote possibility of any change for the better, is considered.

Part three covers the whole ground of draught and harness, and the training of animals for draught purposes. The angle of traction, the collar, the harness, the trace, pole and pole chains, and the height of the wheel all receive faithful attention. The author contends that the angle of traction must be regulated with reference to the horse and not to the carriage exclusively, and that the trace should be attached to the collar opposite the centre, or immovable point of the shoulder-blade. This contention will hardly be disputed, and yet in practice how seldom it is observed. Of the equipages met with in our city streets we shall hardly find one in a hundred with its horses attached in accordance with this rule.

The prevention and cure of restiveness gives title to the fourth and concluding part. In treating this subject much less reliance is placed on the methods of Rarey and other horse tamers than on those of common sense and patient effort. The author while adhering with the loyalty of his race to the old-fashioned methods of English horse breakers, nevertheless, acknowledges the value of the *haute école* and judiciously combines the best features of both systems. It will probably strike many cavalry officers that the free use of the whip and spur that his system calls for, however efficacious when applied by skilled trainers, might be found detrimental and dangerous in our service where we are, under present conditions, forced to rely on inexperienced men for this work. Many excellent rules are given for the management of restive animals, all of which will be found applicable to the daily work of mounted garrisons. This portion of the book will be found valuable in our service through the emphasis which it gives to the fact that the training of cavalry troop horses is not a work of days, to be accomplished by a certain number of throwings after the systems of Grace or Rarey, but one of weeks and months in which, with the aid of proper bitting and saddling, the education of the horse is conducted in the same progressive manner as is that of his rider.

In its style of binding the book is a close copy of the latest English edition. In quality of paper and typography it is fully its equal, while it is provided with the additional convenience of an excellent index.

MOSES HARRIS,
Captain 1st Cavalry.

The Resistance of Guns to Tangential Rupture.*

This is a translation from the Russian of a treatise by Colonel Pashkievitsch, Professor at the Michael Artillery Academy, St. Petersburg.

No more complete theoretical exposition of the entire subject of the elasticity of gun material and the application of the principles thereof to gun construction has been presented to the officers of our service. It must needs be that this publication will become classical with us. It seems especially well suited both by its arrangement and manner of treatment to serve as a text-book in the Fort Monroe course of post-graduate artillery instruction.

Lieutenant Bliss is entitled to the best thanks of all artillery officers for the admirable manner in which he has performed this work and the War Department for publishing it. It is hoped that "Artillery Circular A" indicates that there is to be an alphabetical series of professional publications of which this is the initial issue.

While the contents of the pamphlet are not, of course, of that light nature suited to a summer's afternoon reading, while each page and line calls for close attention and some mathematical information in order to appreciate and follow the discussion, yet a cursory reading reveals two important general characteristics which make the work more easily read than a hasty glance within its covers might give promise of. First, the translator has made use of a simple unambiguous style which renders the meaning of the author at all times clear, secondly the author develops his subject by such easy stages that from the first fundamental proposition to the final application of the principles involved, there is no place where one of average mathematical capacity cannot follow the reasoning and make the deductions without difficulty.

Starting with a discussion of the action of independent forces in the direction of the edges of a prism of an isotropic substance, the author proceeds to treat fully of the "Elasticity of Solid Bodies." In the further treatment of the subject, the initial prism becomes an elementary prismatic mass within the body of the wall of the gun cylinder, and the forces considered are those which act radially, tangentially and axially when the gun is fired. The author takes up in succession and subjects to the most careful analysis, the following headings—"Elastic Equilibrium and Resistance of a Cylindrical Envelope," "Elastic Resistance of Reinforced Cylinders," "The Determination of the Difference in the Diameters of the Cylinders for Shrinking them Successively One upon the Other."

It might seem at first to some that this subject is of interest only to gun-makers and that gun users have properly but little to do with the stresses and strains behind the muzzle of a gun—that it is an ordnance and not an artillery question. We believe however that while it may be perhaps of greater importance to the ordnance officer than to one of the artillery, because this subject lies strictly at the foundation of all gun-making, it is also of very great usefulness to the artillery officer, for it is important that the latter should know in theory what the former applies in practice—otherwise he cannot be a competent judge of the safety-factor of the gun he fires.

Heretofore the subject of the elastic resistance of guns to stresses has been, in a measure, a closed one to artillery officers. Clavarino's series of formulæ appeared some years ago in "Notes on the Construction of Ordnance" and later in the same Notes came a modification of the Clavarino formulæ by Captain, then Lieutenant, Rodgers Birnie, Ordnance Department and still later Captain, then Lieutenant, William Crozier of the same department published an original application of the for-

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**The Resistance of Guns to Tangential Rupture.* Translated from the Russian by First Lieutenant Tasker H. Bliss, 1st Artillery, Aide-de-camp to the Major-General Commanding the Army. Artillery Circular A. Adjutant General's Office, Washington, D. C. 1892.

mule of Birnie and others to the construction of wire-wound guns, but these papers have not, as a rule, been in the hands of or accessible to artillery officers.

It is a matter worthy of comment that, thanks to the efforts of a few officers, we have recently been receiving some of the professional literature of other languages than French and our own. As French and English are the only languages taught in the Department of Modern Languages at West Point, many officers after graduation find their professional horizon limited to the literature of these tongues. In such times as these a man in any profession is to a certain extent handicapped unless he can draw upon the latest information from all nations either by means of translations or the original. Let us hope that Lieutenant Bliss will favor us with other translations from this same source and that the War Department will continue the series so auspiciously begun.

E. M. W.

History of the Tenth Regiment of Cavalry, N. Y. State Volunteers.*

We have received the History of the 10th Regiment, N. Y. Vol. Cavalry ; † a handsomely bound book of 710 pages, clear type, with several maps and over 200 portraits and illustrations, cleverly executed and of great interest as well as the book itself, not only to the members of the regiment, but to many other veterans and also to citizens and especially to the rising generation. The regiment was organized in 1861, and mustered out in 1865 ; its first service after leaving the State, was at Gettysburg, Pa., and the first Union soldier buried there was one of its members. A review of a book usually contains specially attractive or disputable passages from it, but on reading this history, following the regiment and its individual members from their first "skirmish," review and parade at Elmira on their journey to Gettysburg ; their stay there, at Perryville, Havre de Grace, the re-capture of a schooner on Back River, at Baltimore, Washington, and Alexandria ; from the Second Bull Run Campaign to the battle of Fredericksburg ; through the battle of Brandy Station, the action at Aldie, the engagements at Middleburg and Upperville to the battle of Gettysburg ; from Shepherds town, Amissville, Little Washington, Sulphur Springs, Auburn, Bristoe, Morrisville, and Mine Run, to winter-quarters near Warrenton ; with them and Sheridan to Richmond, by way of Todds Tavern, the Catharpin Road, Ground Squirrel Bridge ; through the engagements at Hawe's Shops, Cold Harbor, Sumner's Upper Bridge, Bottoms Bridge, to the Cavalry battle at Trevilian Station ; from the White House to Saint Mary's Church and the James River ; at Lee's-Mills, Deep Bottom, Ream's Station, Poplar Spring Church, Boydton Plank Road, Stony Creek Station, and the Weldon Railroad Raid ; the spirited times of Dinwiddy Court House, Five Forks, Paine's Cross Roads, Sailor's Creek, Farmville and the glorious day of Appomatox to their final discharge at Syracuse ; the reader is kept interested, and the account is uniformly so well written and unusually correct, that to follow the custom would lead to a reprint of the book itself. The personal accounts of members of the regiment are truly interesting. The history is a plain, well written account of the services of the regiment, bearing the imprint of truth combined with the modesty becoming soldiers who have done their duty faithfully ; it has its pathetic as well as ludicrous incidents, and pictures well the life of a cavalry man.

The total number of officers and enlisted men on the roll of the companies of the 10th Cavalry was 2265 ; deduct from this the men promoted and transferred from company to company, will leave 2140 ; Captain Phisterer's history of New York in the Re-

* *History of the Tenth Regiment of Cavalry.* By Colonel N. D. Preston, U. S. V.

† Dan Appleton & Company, N. Y. City.

bellion gives it as 2120; killed in action were 5 officers, 59 enlisted men; 4 officers and 25 enlisted men died of wounds received in action; and 1 officer and 150 enlisted men died of disease and other causes; total loss by death 10 officers and 234 enlisted men; aggregate 244 or over 11 per cent. of the total enrolment. The regiment participated in over 100 battles, engagements, actions and skirmishes with credit to itself and its State.

The historian, Brevet Lieutenant-Colonel and Captain, N. D. Preston, who was a member of the regiment from its inception, joining it as an enlisted man, performed his task, which must have been a labor of love with him, in a highly creditable manner, and we congratulate the survivors and friends of the regiment not only on their honorable service, but also on the manner in which it has been recorded and narrated.

F. P.

Réglage et Organisation du tir des Batteries de Cote.*

This book forms a pleasant contrast to the many schemes lately proposed for Position Finding and Indicating in that it presents a tentative system completely worked out in its smallest details. And the modesty of the Author in claiming only a theoretical solution of the various problems involved is equally refreshing.

The book is divided into four general parts:—

1. General principles.
2. Organs of Synchronism.
3. Scheme for the organization of fire.
4. General summing up.

In the first part the Author endeavors to show the insufficiency of present methods for utilizing the power and accuracy of modern guns and demands the substitution for the methods in use of a rational method founded on the principle of automatic correction and the continuity of the principal systematic causes of error, and the construction of apparatus which the application of this principle necessitates.

Automatism and the continuity of corrections can, as he states, only be realized by the use of apparatus permitting the employment of electrical communications, and necessitates from the start that we should possess the means of transmitting or reproducing at a distance various movements.

The object of the second part is to study separately the organs of synchronism which appear to afford a natural solution of the problem.

In the third part, which is divided into three chapters entitled; Telemetric Apparatus, Apparatus for Correction, Apparatus for Pointing, is set forth in detail a scheme for a complete organization of fire and the geometrical principles of the various apparatus involved.

The fourth part consists of a recapitulation and gives a general idea of what the service of a sea-coast battery, organized after the method indicated, could be made.

The reader is told not to lose sight of the fact that the various apparatus described have not yet been constructed and that for want of experiments and preliminary trials only a purely theoretical description can be given and the Author continues: "The end in view for the time being is simply to excite the interest which their construction would present and procure trial and experiment. It can only be a question of applying the organization on a large scale when these experiments have clearly demonstrated that the apparatus, whose existence is now supposed, are actually capable of being realized."

**Réglage et Organisation du tir des Batteries de Cote.* Par A. Rivals, capitaine d'artillerie. Paris, Berger-Levrault. 1892. 355 p.

It is impossible within the limits of this review to enter into any of the details of the book itself. To be appreciated at all it must be read, and to the artillery officer the reading cannot be dry, but on the contrary, most interesting.

The drawings are well executed and give full details, and the typography is good.

In a word the book will prove a welcome addition to the technical library of any officer interested in the subject of which it treats. H. L. H.

Memorandum of Changes in Infantry Drill Regulations.*

This pamphlet of sixteen pages is in the nature of a manual for readily becoming acquainted with the salient points of difference between Upton's Infantry Tactics and the Infantry Drill Regulations recently adopted for our army.

Incidentally it also serves as a more convenient means of reference to some of the facts apt to be forgotten than the Drill Regulations, unless the student is very familiar with the distribution of the subject matter of the latter.

In many cases what was required by "Upton" is given—for example, on page 1: "Facing distance is sixteen inches instead of *ten*." Such references seem objectionable because the first thing necessary, in order that a new system of drill may be thoroughly learnt, is to completely forget the old.

It might be concluded from reading the 3d par. on page 4 that invariably the position of the first sergeant in line was "in rear of the second file from the right of the first platoon;" whereas, if line is formed with the original first platoon as the second, we find him in rear of the second file from the left of this platoon. Or, as par. 247 of the Drill Regulations states, he "always remains with the original first platoon; when in line, in rear of the second file from the outer flank. * * *" If in the first par. on page 5 the word "latter" were inserted between "which" and "case," the second sentence would read: "It (open ranks) is executed while at a *carry* or at an *order*, in which LATTER case the rifles are held in the position of *trail arms*, etc.;" then no question could arise as to whether or not the *trail* would also be assumed while opening ranks if at a *carry*.

It has already been stated that incidentally the pamphlet also served as a means of reference to some facts likely to be forgotten. As this is not an avowed object of the text it is natural to find that this idea is not fully worked out. Had it been, the value of the work would have been increased. The obstacle in the way of a book on these lines is that what may be difficult for one to remember is easy for another and *vice versa*. So that it would be a hard task to find what would be suitable for the majority. C. H. B.

ARTICLES ACCEPTED FOR THE JOURNAL.

Artillery Service in the Rebellion—Chickamauga and Shiloh.
By GEN. J. C. TIDBALL, U. S. A.

A Forgotten Campaign. - - By LIEUT. J. R. WILLIAMS, 3d U. S. Artillery.

NOTE.—"Practical Drill for Infantry" (Page 705) was originally read before the Post Lyceum at Fort Douglas, Utah.

This announcement was inadvertently omitted from its proper place on page 705.

**Memorandum of Some Changes Noted in the Infantry Drill Regulations.* By Colonel H. S. Hawkins, Commandant of Cadets, West Point, Newburgh. Daily News Press.

Prize Essay—1892.

I.—The following Resolution of Council is published for the information of all concerned:

Resolved, That a Prize of a Gold Medal of suitable value, together with a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest; the subject to be selected by the Executive Council and the Prize awarded under the following conditions:

1. Competition to be open to all persons eligible to membership.*

2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before October* 1, 1892. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize;* and also in their order of merit those deserving of honorable mention.

4. The successful Essay shall be published in the Journal of the Institution and the Essays deemed worthy of honorable mention, shall be read before the Institution, or published, at the discretion of the Council.

5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held Nov. 27, 1891, for the Prize Essay of 1892, is

"*THE ARMY ORGANIZATION, BEST ADAPTED TO A REPUBLICAN FORM OF GOVERNMENT, WHICH WILL ENSURE AN EFFECTIVE FORCE.*"

III.—The gentlemen chosen by the Council to constitute the Board of Award for the year 1892, are:—

SENATOR CHARLES F. MANDERSON,
SENATOR REDFIELD PROCTOR,
GENERAL JOHN M. SCHOFIELD, U. S. A.

WM. L. HASKIN,
Secretary.

GOVERNOR'S ISLAND,
November 28, 1891.

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*"All officers of the Army and Professors at the Military Academy shall be entitled to membership, *without ballot*, upon payment of the entrance fee. Ex-officers of the Regular Army of good standing and honorable record shall be eligible to full membership of the Institution *by ballot* of the Executive Council.

"Officers of the United States Navy or Marine Corps shall be entitled to membership of the Institution *without ballot*, upon payment of the entrance fee, but shall not be entitled to vote, nor be eligible to office.

"All persons not mentioned in the preceding sections, of honorable record and good standing, shall be eligible to Associate Membership *by a confirmative vote* of two-thirds of the members of the Executive Council present at any meeting. Associate Members shall be entitled to all the benefits of the Institution, including a share in its public discussions, but no Associate Member shall be entitled to vote or be eligible to office."

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XUM

Historical Sketches of the Army.

THE following named officers have volunteered, or have been designated to prepare Historical Sketches of their Corps or Regiments for publication in this JOURNAL.

*Adjt. General's Dept.....GEN. J. B. FRY.
Quartermaster's Dept....GEN. S. B. HOLABIRD.
Subsistence Dept.....GEN. J. W. BARRIGER.
Medical Department.....SURGEON CHAS. SMART.
*Pay Department.....COL. A. B. CAREY.
*Signal Corps.....LIEUT. WM. A. GLASSFORD.
1st Cavalry. .....LIEUT. R. P. P. WAINWRIGHT.
*2d Cavalry.....MAJOR A. E. BATES and CAPT. E. J. MCCLERNAND.
3d Cavalry.... ....LIEUT. THOS. B. DUGAN.
*5th Cavalry..... .LIEUT. EBEN SWIFT.
6th Cavalry.... .....CAPT. WM. H. CARTER.
*8th Cavalry.....CAPT. C. M. O'CONNOR.
*10th Cavalry.....LIEUT. JOHN BIGELOW, JR.
1st Artillery..... ..... COLONEL L. L. LANGDON.
2d Artillery.....LIEUT. W. A. SIMPSON.
3d Artillery.....LIEUT. W. E. BIRKHIMER.
*4th Artillery.....LIEUT. A. B. DYER.
2d Infantry..... .....GEN. FRANK WHEATON.
3d Infantry..... .....CAPT. WM. GERLACH.
4th Infantry.....LIEUT. JAS. A. LEYDEN.
6th Infantry. .....LIEUT. CHAS. BYRNE.
7th Infantry. .....LIEUT. A. B. JOHNSON.
8th Infantry..... ..... LIEUT. W. P. RICHARDSON.
9th Infantry.....LIEUT. E. B. ROBERTSON.
*10th Infantry.....LIEUT. S. V. SEYBURN.
*11th Infantry..... ..MAJOR J. H. PATTERSON and CAPT. R. C. J. IRVINE.
12th Infantry.....LIEUT. CHAS. W. ABBOT, JR.
13th Infantry.... .....LIEUT. M. J. O'BRIEN.
*14th Infantry.....COLONEL T. M. ANDERSON.

* Published in JOURNAL.

15th Infantry.....CAPT. H. R. BRINKERHOFF.
16th Infantry.....CAPT. WM. V. RICHARDS.
17th Infantry.....CAPT. GEORGE RUHLEN, A. Q. M.
**18th Infantry*.....LIEUT. C. H. CABANISS, JR.
**19th Infantry*..... ...LIEUT. C. C. HEWITT.
20th Infantry..... ....CAPT. J. N. COE.
**21st Infantry*.....CAPT. FRED. H. E. EBSTEIN.
22d Infantry.....CAPT. O. M. SMITH, C. S.
23d Infantry.....LIEUT. C. H. HEYL.
24th Infantry..... ...LIEUT. H. W. HOVEY.
**25th Infantry*. .....LIEUT. GEORGE ANDREWS.

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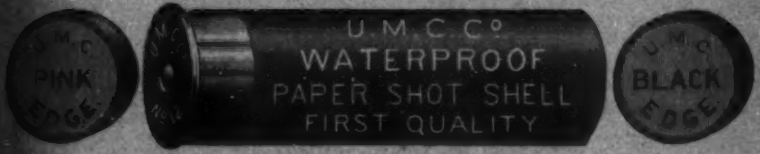

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NINETEENTH REGIMENT OF INFANTRY.

By LIEUT. C. C. HEWITT, 19TH U. S. INFANTRY.

THE Nineteenth Infantry was organized in conformity with the President's proclamation of May 4, 1861, and the officers were assigned to the regiment in pursuance of General Order No. 33, A. G. O., dated June 18, 1861, and revised by G. O. No. 65 of the same series. One colonel, one lieutenant-colonel, three majors, sixteen captains, twenty-two first lieutenants and two second lieutenants, were named as the officers of the regiment. Seven of them were officers of the regular service, and were transferred to the Nineteenth with an advancement of one grade; ten were from the volunteers; twenty-six from civil life and two,—second lieutenants,—from the ranks of the regular service.

Major (Brevet Lt.-Col.) Edward R. S. Canby, 10th Infantry, was appointed colonel, and the headquarters of the regiment were established at Indianapolis, Indiana, where Lieut.-Col. Edward A. King issued his first general order, dated July 10, 1861, assuming command of the regiment. First Lieutenant Egbert Phelps was designated as acting adjutant and First Lieutenant Edward Moale was appointed quartermaster. Colonel King also issued orders establishing recruiting rendezvous in eleven different cities in Indiana, and one in Cincinnati, Ohio, and an officer was designated to take charge of each. The senior major,—Stephen D. Carpenter,—reported for duty August 7, and was assigned to the command of the recruits.

Company A, 1st Battalion, was organized August 24, and at the end of August the regiment consisted of one organized company and 76 unassigned recruits. The first duty it was called upon to perform was on the 31st, when the Governor of Indiana called upon the commanding officer for assistance in preserving peace in the city of Indianapolis. The unassigned officers were ordered to report to Major Carpenter and he was ordered, with Company A and the unassigned recruits to the circle. Their presence seems to have been all that was required to preserve order. While they remained at Indianapolis the unassigned officers and recruits were often put on duty guarding prisoners and escorting them to different northern prisons.

Company B, First Battalion, was organized in September, and in October Companies A and B were ordered to report to General Sherman in Kentucky, and were attached temporarily to the First Battalion of the 15th Infantry. Company C was organized in November and Company D in December, 1861.

On the 1st of January, 1862, 1st Lieutenant W. W. Gilbert was appointed adjutant of the regiment, and in February orders were issued designating Companies A, B, C and D, (organized), and E, F, G and H (unorganized), as the First Battalion of the regiment, and Major Carpenter was assigned to

the command. Companies C and D, under command of Major Carpenter were ordered to proceed to Louisville, Ky., and report to Gen. Buell.

Company E was organized March 15, 1862, and one week later left Indianapolis for Nashville, Tenn. It participated in the battle of Shiloh, April 6–7, 1862, with companies A, B, C and D, under the command of Major Carpenter. The loss in this battle was 37 killed and wounded. Capt. Fessenden and Lieutenant Lyster were wounded. Major Carpenter was complimented for his gallant conduct in this engagement by his brigade commander—General Rousseau.

Company F was organized in April and sent to Pittsburg Landing, Tenn.

Companies G and H were organized in May and these two companies completed the organization of the First Battalion, but instead of joining the battalion they were ordered by telegraph, the day that H was organized, to proceed to Washington, D. C., which city was in danger of being captured, and to which point all available troops were being hurried. These companies participated in the various manœuvres of the Army of the Potomac, marching and countermarching, embarking and disembarking, and had a varied existence; but being orphans, were used for guarding ammunition trains and for provost-guard duty. Company G was present at the battles of South Mountain and Antietam, but was not engaged.

Colonel King and Major Carpenter wrote letters in vain to the War Department asking to have these companies transferred to Tennessee to join their proper battalion, or, if it were not practicable to send them to their own battalion, to have them assigned to duty with some regular battalion in the Army of the Potomac, where they might receive proper instruction and drill. In September Company H was detailed for duty as a body guard to General McClellan, and in October Company G was assigned to duty with the 1st Battalion of the 17th Infantry in the regular brigade of Sykes' Division.

Lieutenant-Colonel King having been made colonel of the 68th Indiana Volunteers, went into the field with that regiment, leaving the headquarters of the 19th Infantry without a head, as Colonel Canby had been made a brigadier-general of volunteers, and was in command in New Mexico. In November the headquarters were ordered from Indianapolis to Fort Wayne, Mich., but were not destined to remain long at the latter place, for Major Carpenter, now being the senior officer on duty with the regiment, applied to the War Department to be furnished with the colors, and renewed the request which he had made several times when Col. King was commanding, to have the band join the First Battalion in the field. Late in the fall this request was finally granted, but before the band reached the battalion the gallant commander of the 19th had given up his life at the battle of Murfreesboro.

Major Carpenter was a brave, gallant and efficient officer, and his untimely death surely deprived him of a brilliant future. In December he made a final appeal to the War Department to have Companies G and H transferred from the Army of the Potomac to his battalion. His letter was manly, soldierly and pathetic. He called attention to his long service and to his depleted battalion of scarcely two hundred men. In support of his

argument for having a larger battalion he said:—"It is not unreasonable to suppose that my battalion in battle may be ordered to support a battery as it was at Shiloh, and be met by a battalion or regiment numbering eight hundred or a thousand men; * * the result would be certain disgrace." Just two weeks later the regular brigade of which the battalion of the 19th Infantry formed a part, was engaged in the battle of Murfreesboro supporting batteries. The contest was in the pines the first day. The enemy was in overwhelming numbers, and it was while struggling to hold his battalion against great odds, that Major Carpenter fell from his horse bleeding from six mortal wounds. His prediction almost came true, except as to the disgrace. The loss of the battalion of six companies was 65 killed and wounded. The loss of the regular brigade was nearly 36 per cent., almost double the loss of the other two brigades of the division.

Eighteen months of service in the field, including a march of over a thousand miles, two battles and a number of skirmishes, had reduced the battalion from 500 to less than 150 men. Four of the officers who had gone out with companies were serving as staff officers with the brigade and division commanders, and one was commanding a volunteer regiment, so that at the battle of Murfreesboro only one major, one captain, two 1st lieutenants and four 2d lieutenants were serving with the battalion.

After Major Carpenter was killed on the first day, Captain J. B. Mulligan assumed command of the battalion and handled it very skilfully, but he scarcely had time to write a report of the battle and an obituary of the late commander before captains, zealous commanders, began to spring up like mushrooms from the ground, and in a few weeks no less than six of them had assumed command of the battalion of six companies; but the duration of command of the senior one was short, for Major Dawson, who up to this time had been in the North, joined and assumed command.

Early in 1863 the band from Fort Wayne, and Companies G and H from the Army of the Potomac, had joined the headquarters in the field. The final request of Major Carpenter had been complied with, but he had not lived to see his labors rewarded. Company A, 2d Battalion, had also been organized and had joined the First Battalion at Murfreesboro.

On the 19th and 20th September the 1st Battalion, with Company A of the 2d, aggregating 14 officers and 185 men and commanded by Major Dawson, was engaged in the battle of Chickamauga. The first day, September 19th, Major Dawson was wounded, and 66 non-commissioned officers and privates were killed and wounded. Captain E. L. Smith, a gallant and accomplished officer, succeeded Major Dawson and commanded the regiment until he was captured. At the end of the second day's battle a 2d lieutenant was found in command, reporting four officers and 51 men for duty. Lieutenants Fogarty and Miller had been killed; Captain Cummings and Lieut. Ayres wounded, and Captains Cummings, Smith, Hart and Pearce and Lieutenants Causten, Bickham and Gageby had been taken prisoners.

Colonel King was killed in this battle, September 20th, while serving as colonel of the 68th Indiana Volunteers, but at the time of his death was commanding a division. A short time before this he had been promoted to be colonel of the 6th Infantry.

During the Chattanooga-Ringgold campaign and at the battle of Missionary Ridge, the 19th Infantry was a mere detachment and was commanded by a captain. The losses of the regular battalions had been so great that two and three companies had to be consolidated for drill; and in the fall the 19th Battalion was found in camp at Chattanooga, consolidated with the 16th Infantry, under the command of Captain R. E. A. Crofton, and designated as a "Detachment of the 16th and 19th Infantry." The band had lost nearly all of its property and instruments during its year in the field, and on December 1st, pursuant to orders from the War Department, set out for headquarters at Fort Wayne, Mich.

In the year 1863 there was almost a complete change in field officers. DeLancey Floyd-Jones had become lieutenant-colonel; Major Dawson had been promoted to the 15th Infantry; and Capt. J. H. Potter of the 7th to be major of the 19th in his place. Pinckney Lugenbeel had been promoted major vice Carpenter, and Charles C. Gilbert major vice Willard, killed July 2, 1863, at Gettysburg.

Major Willard had never served with the regiment. He was appointed a major in the 19th while a captain in the 8th Infantry, to date February 19, 1862, and all his war service was with the Army of the Potomac, first as commander of the provost guard, and later as colonel of the 125th N. Y. Volunteers. He was commanding the 3d Brigade, 3d Division, 2d Corps when he was killed near Plum Creek. Fort Willard, a redoubt on the Potomac, was named in orders from the War Department, "after George L. Willard, Major 19th Infantry."

The beginning of the year 1864 found the regiment without a single field officer for duty either in the field or at regimental headquarters, but on March 7th, Major Lugenbeel reported at Fort Wayne and assumed command of the regiment. The battalion was in camp near Chattanooga, under the command of a captain, where it remained until February 22d, when it started out with its brigade and division on a reconnoissance, supporting the cavalry, and marched towards Ringgold, Georgia. The marching was in presence of the enemy and skirmishing was kept up constantly. On the 28th, Lieutenant Robert Ayres, the battalion adjutant, while posting pickets at Taylor's Ridge, was captured by the enemy's cavalry. On March 13th the battalion was engaged in the battle of Resaca, Georgia, and on the 28th in the battle of New Hope Church, near Dallas, Ga. The companies had now become so much reduced that Captain Mooney, the battalion commander, organized the battalion into four companies, making A, B and E the first company; D, second company; C and F, third company; G and H, and A, 2d Battalion, fourth company. Previous to this consolidation in the field Company D had been reorganized at regimental headquarters with 63 enlisted men, and Captain Lewis Wilson had been assigned to the command of it.

On the 1st of June, 1864, the battalion was at Kenesaw Mountain under the command of Captain Egbert Phelps, and a few days later an advance was made and the regiment took part in the battles of Kenesaw Mountain, Neal Dow Station, Peach Tree Creek, and finally, on July 22, took a position on the railroad within two miles of Atlanta and built breastworks. The

long campaign before reaching Atlanta, and the battles in front of Atlanta, had reduced the battalion so much that the enlisted strength present for duty at the end of August was only 336. On September 1, the battalion took part in the battle of Jonesboro, and on October 1, it went into camp at Lookout Mountain, where it remained during the winter, with an enlisted strength present of 510.

During the month of February, 1865, at Fort Wayne, Mich., Companies B and C, 2d Battalion, were organized, and in March, Company A, 2d Battalion, was reorganized, and Captain W. W. Gilbert was assigned to command it. Captain Gilbert was also ordered to conduct Companies B and C, 2d Battalion, from Fort Wayne to the 1st Battalion in the field.

On April 3, 1865, Lieut.-Col. Floyd-Jones assumed command of the regiment, and Major Lugenbeel proceeded to Lookout Mountain and assumed command of the 1st and 2d Battalions.

Company B, 1st Battalion, was reorganized in April and shortly afterwards was ordered to the field, as was also Company A, 2d Battalion. Company A, 3d Battalion, was organized May 16, and Lieut. L. T. Morris was assigned to it.

In August, 1865, the battalion marched from Lookout Mountain to Chattanooga, and from that point was transferred by rail to Augusta, Ga. During the month of October, Companies D and E, 2d Battalion, were organized and sent from Fort Wayne to Augusta, and on the 11th of October the headquarters of the regiment and Company A, 3d Battalion, were transferred from Fort Wayne to Newport Barracks, Ky.

In November, Company F, 2d Battalion, was organized and shortly after was sent to Little Rock, Ark., to report to General Reynolds. Companies C and B were organized in December.

In the early part of 1866 the 1st Battalion and part of the Second proceeded from Augusta, Ga., to Little Rock, Ark. The small-pox broke out on the way and a great many of the men became frightened and deserted before reaching their destination. Upon arriving at Little Rock, two companies of the 2d Battalion took station there and the remaining companies proceeded to Camden and the southern part of the State of Arkansas, and entered upon the unpleasant reconstruction duty. The headquarters and a part of the 1st Battalion remained at Little Rock, and the balance of it went to Fort Smith and the Indian Territory frontier.

Companies D and E, 3d Battalion, were organized at Newport, Kentucky.

In February, Company F, 2d Battalion, and Companies A, B, C and D, 3d Battalion, went from Newport to Little Rock, and the headquarters of the 1st Battalion from Little Rock to Fort Gibson, I. T. Majors Gilbert and Potter having reported at headquarters were assigned to the command of the 2d and 3d Battalions respectively. This was the first time since the organization of the regiment that more than one major had been on duty with it, yet with the exception of the colonel, all the field officers had changed since first assignment. In March, Colonel Floyd-Jones was ordered from Newport to Little Rock with regimental headquarters.

The organization of the companies of the 2d and 3d Battalions was continued during the spring and summer of 1866, and before July 1st the regi-

ment had its complement of three battalions with eight companies each, aggregating nearly two thousand men.

The three-battalion organization of the 19th was short lived, for the regiment had scarcely been completed when the act of Congress approved July 28, 1866, did away with the battalion organization for infantry and made a regiment out of each battalion by simply adding a colonel, a lieutenant-colonel, and two companies to each battalion. Under the provisions of this law the 1st Battalion became the 19th Infantry, the 2d Battalion the 28th Infantry, and the 3d Battalion the 37th Infantry. Colonel Canby, who had never joined the regiment, was made a brigadier-general, and S. K. Dawson, formerly major of the 19th, now became the colonel. Lieut.-Col. Floyd-Jones and Major Lugenbeel remained in the regiment in their respective grades. The band became one of the fifteen post bands authorized by law, and remained at Little Rock. The headquarters and Companies I and K moved to Fort Gibson, I. T., but in March, 1867, the headquarters moved to Fort Smith, and later in the year most of the companies of the regiment were assembled at Fort Smith and vicinity.

The regiment remained at Fort Smith during the year 1868, and until consolidation began in 1869. Section 2 of the appropriation bill of that year enacted "that there shall be no new commissions, no promotions, and no enlistments in any infantry regiment until the total number of infantry regiments is reduced to twenty-five," and the Secretary of War was directed to consolidate the infantry regiments. The 28th, which was formerly the 2d Battalion of the 19th, was consolidated with the 19th, and Colonel C. H. Smith, who was colonel of the 28th, became colonel of the 19th upon the consolidation. The separation of the two battalions had been more in name than in fact. Both regiments served in the sub-district of the Arkansas, commanded by Colonel Smith.

After consolidation the regiment was still kept on reconstruction duty in Arkansas and Louisiana, and companies and detachments were sent to the most remote districts for the purpose of assisting in reëstablishing the civil government. The regiment had most trying duties to perform, and it was admitted that the work was exceptionally well done; and owing to the excellent judgment of the colonel commanding the regiment and sub-district, and his clear interpretation of what was the intention of Congress, the State of Arkansas was the first one readmitted under the reconstruction laws.

Early in the year 1870 the regiment was moved to Louisiana with headquarters at Jefferson Barracks, and from January to May Colonel Smith was detached from his regiment and placed in command of the Department of Louisiana, according to his brevet rank of major-general.

The Act of Congress approved July 15, 1870, caused many changes in the regiment, and Colonel Smith was a member of the Board of Officers convened under Section 11 of that Act.

During the summer of this year the yellow fever broke out in New Orleans and the headquarters and the companies stationed in New Orleans moved to Ship Island, where they remained till November, when they were ordered to New Orleans to preserve the peace during the election.

Colonel Smith returned from Washington in January, 1871, and while

the regiment remained in Louisiana he had command of all the troops assembled in the vicinity of New Orleans. In January, 1872, all the companies of the regiment were again summoned to New Orleans and kept busy during the month preserving order and preventing mob violence.

During the year 1873 Companies G and I were stationed at Shreveport, La., and went through the yellow fever epidemics which scourged all that section of country.

In June, 1874, the regiment was transferred to the Department of the Missouri. The headquarters and two companies went to Fort Lyon, Colorado, and the other companies to the Indian Territory and Kansas.

In the spring of this year the Indians of the Indian Territory went on the war path. The regiment arrived in the Department too late to enter into the active campaign, but the companies of Camp Supply and Fort Dodge were kept on the road most of the time escorting supply trains to the troops in the field under the command of General Miles. Companies A and K were engaged in guarding the railroad and in scouting in central Kansas, and in January, 1875, a detachment of Company K, while returning to Fort Wallace, Kansas, after a successful pursuit and capture of Indians, was caught in a blizzard and had great difficulty in reaching the post.

In the following April, Lieutenant Hewitt and a detachment of Company K were with Troop H, 6th Cavalry, when, in an engagement on Sappa Creek, Kansas, a whole band of Indians was exterminated.

In the fall of 1878, the Indians of Dull Knife's band broke away from the agency in the Indian Territory and attempted to make their way north to the Sioux and Cheyennes in Dakota. Lieut.-Col. Lewis, 19th Infantry, who was then commanding Fort Dodge, Kansas, organized a force to intercept them. The Indians succeeded in crossing the Arkansas River west of Fort Dodge, and Colonel Lewis, with four troops of the 4th Cavalry, Company G, and detachments of Companies D and F, 19th infantry, with Captain Bradford and Lieutenant Gardener, went in pursuit. The Indians were overtaken after a two days' march, and in an engagement which took place Colonel Lewis received a wound which severed his femoral artery and from which he died the next day. In the death of Colonel Lewis the regiment met with an irreparable loss. He possessed in a remarkable degree the most valuable traits of a model soldier. He commanded with sternness, but was always just and was honored and respected by all the officers and men who knew him.

In October, 1879, Company G, mounted, was ordered to New Mexico to take the field against a hostile tribe of Indians, and participated in the campaigns under Colonel Hatch, 9th Cavalry, and Colonel Buell, 15th Infantry. Colonel Buell, in relieving this company from duty with his command, complimented Captain Bradford and Lieut. Gardener in orders.

Companies A, C, D, E, F and I participated in the campaign on the Uncompagre in Colorado, under Colonel Mackenzie, 4th Cavalry, in 1879 and 1880.

In the fall of 1881 the regiment was transferred to the Department of Texas. The colonel, major, headquarters and Companies B, C, D, E, G and

K, took station at Fort Brown, November 7th. The lieutenant-colonel and Companies H and I went to Fort Ringgold and Companies A and F to Fort McIntosh.

Early in the summer of 1882 rumors were afloat that yellow fever existed in the city of Matamoras, Mexico, which is on the Rio Grande, just opposite Fort Brown and Brownsville. The doctors of the two cities were divided in their opinions. Some claimed from the first appearance of the disease that it was yellow fever, but the greater number claimed that it was not. Brownsville did not quarantine against Matamoras till August, and then the fever had already crossed the river and was in Texas.

How to protect the troops now became a serious problem. It was at first proposed to move them up the river, but the State quarantine would not permit it. The saddest part to contemplate was that the women and children would have to share the lot of the soldiers. The recollections of Shreveport and Memphis made stout hearts grow weak. No little anxiety and excitement existed in the command and just at this time the regimental commander received an order to go to Newport, Ky., on a court-martial. He was well aware of the imminent peril of his command and telegraphed the fact to the War Department, but was only relieved from the detail after making a second urgent request. The request was granted and it was a great relief to the garrison.

Steps were immediately taken to get the command out of the post as there were several cases of fever in it. There was not tentage for the whole command, and Captain Witherell volunteered to remain in the post with his company (C). This company and troop I, 8th Cavalry,—Captain Hennisee's,—remained in the garrison. The headquarters, band, and five companies moved about fourteen miles down the river and went into camp, where they remained till fall, without a single case of fever.

In the garrison every precaution was taken to keep the infected away from the non-infected. There were not many cases among the soldiers in barracks, the greater number occurring among the families and civil employés of the post. Captain Witherell's family was the first one invaded. His son and only child died, also his servant. He and his wife both had the fever, but recovered. Captain Lyster's family all had it except Mrs. Lyster. W. C. Gorgas, the assistant to the post surgeon, had a severe case, but Lieutenant T. M. Wenie, 19th Infantry, was the only officer who fell a victim.

The high water of the Rio Grande, overflowing its banks, made an island of the post. The post cemetery had to be reached by boat, and the water was so near the surface that the graves would fill while being dug, and it was necessary to put stones on the coffins to hold them down. The ground was so soft that often the neighboring coffins would roll in on the grave diggers. It was a long and weary summer to the garrison of Fort Brown, and the coming of flies, followed by frost, was heralded with delight.

In December the headquarters and all the companies, except G, of the Fort Brown garrison, moved to Fort Clark, Texas.

In May, 1890, the regiment moved from Texas to the Division of the Atlantic, and took the stations on the Lakes.

The 19th Infantry is the only regiment in the Army which has not changed its colonel since consolidation in 1869.

In the year 1886 Captain Lyster was promoted to be major of the 6th Infantry. He was the last officer to leave the regiment of all those who were commissioned in it in 1861. The only other officers now in active service who were originally commissioned in the regiment are Colonel Edward Moale, Major J. H. Gilman and Major Louis T. Morris.

TWENTY-FIRST REGIMENT OF INFANTRY.

By CAPT. FRED. H. E. EBSTEIN, 21st U. S. Infantry.

THE Twenty-first Regiment of Infantry was called into existence by Presidential order of May 4, 1861, confirmed by Act of Congress of July 29, 1861, as the Second Battalion of the Twelfth Regiment of Infantry. Although Major Richard S. Smith and other officers were appointed and assigned to the battalion soon after, it was not until May, 1862, that the organization of the first four companies was accomplished at Fort Hamilton, New York Harbor. These companies, namely, A, Captain Anderson, B, Captain Dallas, E, Captain Quimby, and G, Captain Pennington, were at once despatched to the field and arrived, May 26, at Harper's Ferry, where they, together with several companies of the Eighth Infantry, were formed into a provisional battalion under Captain Thomas G. Pitcher, Eighth Infantry. The very next day the battalion received its baptism of fire in a skirmish on the picket line with "Dick" Taylor's Brigade of Jackson's Corps. At Cedar Mountain, August 9, 1862, the battalion opened the fight as skirmishers, and later covered the retreat, meeting with heavy loss. Captain Pitcher having been wounded early in the action, the command of the battalion fell to Captain Thomas M. Anderson. When the army fell back to the line of the Rappahannock the companies were engaged in skirmishes at Rappahannock Ford, Sulphur Springs and Waterloo Bridge. About this time Companies C, Captain King, and D, Captain Dunn, which had been organized at Fort Hamilton, joined the battalion, which from this time on formed a separate organization under Captain Anderson. From Waterloo Bridge a forced march was made to Warrenton Junction, where a large amount of abandoned property was destroyed and another skirmish took place. The battalion was present at the battle of Bull Run (second), but was not actively engaged—and at Chantilly. When the army retired to the Potomac the battalion formed the rear guard, fighting all day against rebel cavalry and artillery. The following month the battalion joined the First Battalion and both became part of the First Brigade (Buchanan), Second Division (Sykes), Fifth Army Corps (Porter). Thereafter both battalions served together and participated in the battles of South Mountain, Antietam and Snicker's Gap. At Fredericksburg the battalion covered the retreat of the 5th Corps, and was the very last to recross the river.

In the fall of 1862 Companies F, Captain Putnam, and H, Captain Franklin, were organized but remained in garrison at Fort Hamilton.

In March, 1863, owing to their reduced numbers, Companies B, E and G were broken up, and the enlisted men transferred to Companies A, C and D. These companies, together with those of the First Battalion, which had been in like manner consolidated, then formed one organization, although

retaining their distinct battalion designations. They participated, under command of Major Smith, in the battle of Chancellorsville, and under command of Captain Dunn, in that of Gettysburg.

Companies F and H, Captain Franklin in command, were part of the force sent to quell the draft riots in New York City, July 13 to 20, 1863, and had encounters with the rioters in 2d Avenue, 22d Street and other places, killing many. These two companies, in September, 1863, were sent to the field, and with the remainder of the battalion were present in the actions at Bristoe Station, October 14, Rappahannock Station, November 7th and Mine Run, November 27.

In the campaign of 1864 the battalion took part in the battles of the Wilderness and Laurel Hill, May 8 to 13, sustaining heavy loss. It was further engaged near Spottsylvania Court House, May 14 and exposed to fire of artillery and sharpshooters May 13 to 19 while in trenches and on picket. May 22 and 23 it crossed the North Anna River, engaging and repulsing the enemy, and on the 29th and 30th was skirmishing at Tolopotomoy Creek. June 1 to 5 it was engaged in skirmishes near Bethesda Church and swamp north of the Pamunky River, and June 17 it arrived in front of the enemy's works at Petersburg. The battalion was again in action on June 18 at Petersburg, on the 21st on Jerusalem plank road and on the 30th before Petersburg.

War Department orders of July 30, 1864, disbanded Companies A, C, D, F and H and transferred the enlisted men to the 1st Battalion. The other companies having previously been disbanded, the 2d Battalion here ceased to exist as an organization and so remained unorganized until September, 1865, when Companies A and B were again formed at Fort Hamilton. By the end of December the battalion had been completely reorganized and its eight companies, in command of Captain Thomas M. Anderson, were serving at Camp Winthrop, near Richmond, Virginia.

The Act of Congress approved July 28, 1866, transformed the battalion, by the addition of two new companies, into the Twenty-first Regiment of Infantry. Regimental headquarters were established at Petersburg, Virginia, and the following were appointed field officers of the new regiment: Colonel George Stoneman, Lieutenant-Colonel S. S. Carroll, Major Dickinson Woodruff. The latter, in regimental orders dated Petersburg, December 9, 1866, assumed command of the new organization, the company officers of which were;

Captains: Thomas S. Anderson, Thomas S. Dunn, Henry R. Putnam, Walter S. Franklin, Henry E. Smith, Robert L. Burnett, Evan Miles, W. McC. Netterville.

First Lieutenants: Madison Earle, Thomas L. Alston, E. B. Knox, George H. Burton, George G. Greenough, V. M. C. Silva, William Crosby, Alfred S. Newlin.

Second Lieutenants: John F. Cluley, Thomas E. Lawson, B. H. Rogers, Thomas F. Riley, Thomas Rafferty, E. W. Stone.

Companies I and K were organized at Petersburg in January, 1867, and Captains W. P. Wilson and W. McK. Dunn, Jr., appointed to command them.

During the next two years the regiment remained in Virginia (then the First Military District), engaged in the varied duties pertaining to the reconstruction period. The companies were for the greater part of the time in temporary camps in different portions of the State. Thus, companies occupied Richmond, Petersburg, Fredericksburg, Winchester, Yorktown, Farmville, Williamsburg, Norfolk, Huguenot Springs and Fort Monroe during the period named.

Under the Act of Congress, approved March 3, 1869, the Thirty-second Regiment was consolidated with and became part of the Twenty-first. The former (which had originally been the third battalion of the Fourteenth Infantry) was stationed in Arizona and thither the Twenty-first was ordered to proceed. The regiment left Richmond April 12, 1869, and was forwarded from Omaha in two battalions to San Francisco over the then just completed Union and Central Pacific Railroads, being the first troops that made the transcontinental journey entirely by rail. The regiment remained at the Presidio, California, until June, when the various companies were put en route for their stations in Arizona and the consolidation thus finally completed. At this time the regiment numbered 1180 in enlisted men. The officers were:

Colonel George Stoneman, Lieutenant-Colonel Frank Wheaton, Major Milton Cogswell, Adjutant George H. Burton, Quartermaster John L. Johnston.

Company A.—Captain Patrick Collins, 1st Lieut. T. F. Riley, 2d Lieut. John M. Ross.

Company B.—Captain Henry E. Smith, 1st Lieut. B. H. Rogers, 2d Lieut. W. L. Sherwood.

Company C.—Captain W. H. Brown, 1st Lieut. W. McK. Owen, 2d Lieut. E. B. Rheem.

Company D.—Captain Thomas S. Dunn, 1st Lieut. J. H. Purcell, 2d Lieut. James Riley.

Company E.—Captain Evan Miles, 1st Lieut. V. M. C. Silva.

Company F.—Captain H. R. Putnam, 1st Lieut. R. Pollock.

Company G.—Captain R. L. Burnett, 1st Lieut. W. T. Dodge, 2d Lieut. E. R. Theller.

Company H.—Captain R. F. O'Beirne, 1st Lieut. J. F Cluley, 2d Lieut. F. H. E. Ebstein.

Company I.—Captain W. McC. Netterville, 1st Lieut. G. W. Evans, 2d Lieut. James Calhoun.

Company K.—Captain George M. Downey, 1st Lieut. J. F. Lewis, 2d Lieut W. J. Ross.

Regimental Headquarters were located at Drum Barracks, California, and the companies were distributed to Camps Reno, Goodwin, Verde, Bowie, Lowell, McDowell, Date Creek and Crittenden, all in Arizona. During the three years following, the regiment was actively employed in scouting after Indians, escorting mails, building wagon roads and erecting public buildings, all of the above-named posts having been constructed or reconstructed entirely by the labor of the troops. As an illustration of the danger attending the escorting of the United States mails it may be mentioned that no

less than fifteen enlisted men of the regiment were killed at divers times by attacks from Indians while on this duty. In April, 1870, Company A, under Captain Collins, overtook and attacked a party of hostile Apaches near Pinal Creek, killing eleven and capturing four. The following month Company B had an encounter with a party of Apaches in Tonto Basin, killing several. In July Lieut. Cluley, with a detachment of Company H, surprised a hostile rancheria near Date Creek, killing two Indians. The following November Companies A, E, G and I established a camp in the Pinal Mountains, remaining there until July, 1871. In the latter month, while on the march to Camp Bowie, Company G, Lieut. Theller commanding, had an engagement with the Indians and repulsed them, after a sharp fight, with a loss of 15 killed and a number wounded. The troops lost 1 killed and 3 wounded. Colonel Stoneman was retired August 16, 1871, and Colonel Robert S. Granger succeeded him.

In 1872 the regiment was transferred to the Department of the Columbia and distributed to stations as follows: Headquarters and B, C and I, Fort Vancouver, Wash. Terr.; A, Camp Harney, Oregon; D, Camp Warner, Oregon; E, Fort Colville, W. T.; F, Fort Klamath, Oregon; G, Fort Lapwai, Idaho; H, Camp San Juan Island, W. T., and K, Fort Boise, Idaho.

Hardly had the regiment reached its new stations when hostile acts of the Modoc Indians in southern Oregon called into the field the available troops in Oregon, Washington and California. A battalion consisting of Companies B and C (to which Company I and a portion of Company F were subsequently added), under command of Major Edwin C. Mason, left Fort Vancouver, December 3, 1872, for field service. The battalion had to march a distance of 250 miles to reach the Lava Beds, a rugged and much broken stretch of volcanic rock formation located on the banks of Tule Lake, in southern Oregon, in which the Modocs under "Captain Jack" had, after barbarously murdering the unprotected settlers of that region, taken up an impregnable position. Lieut.-Col. Frank Wheaton was in command of the troops sent to subdue these turbulent Indians. On January 17, 1873, he attacked the Modoc stronghold with his entire force, consisting, besides Major Mason's battalion, of several troops of the First Cavalry and some companies of Oregon and California volunteers. Owing to the rough nature of the ground to be passed over, the inaccessibility of the Indian position and the prevalence of a thick fog, the attack was unsuccessful and the troops were forced to withdraw. The small battalion of the Twenty-first (Company I had not yet joined) lost in killed 5 and in wounded 8 enlisted men. The following officers participated in the engagement: Lieut.-Col. Wheaton, Major Mason, Captain Burton, Lieutenants Boyle, Ross, Rheem and Moore. Additional troops were hurried forward, but it was not until after the treacherous murder of Brig.-Gen. E. R. S. Canby in a peace council that active operations were resumed. On April 11 First Lieutenant William L. Sherwood, while receiving a flag of truce, was treacherously fired upon, receiving two wounds, of which he died a few days later. The battalion was engaged in a skirmish April 12, and in the three days' fight which resulted in driving the Indians from their stronghold, April 17. After the final capture of the hostiles the troops were returned to their posts by way of

Forts Klamath, Warner, Harney and Walla Walla, making a march of 634 miles. The battalion had been in the field eight months.

On December 10, 1873, Colonel Granger was retired from active service, and was succeeded by Colonel Alfred Sully, an officer of long and distinguished service.

During the three years following, the regiment performed the usual garrison duties with various changes of station of the different companies. Thus companies were in garrison at Forts Townsend, Walla Walla, Stevens and Canby at divers times. Company B garrisoned Fort Wrangel, Alaska, when that post was re-occupied.

In consequence of the sudden outbreak of the Nez Percés Indians in Idaho in June, 1877, the greater portion of the regiment was promptly ordered into the field. First Lieut. Edward R. Theller, who was attached to a command sent from Fort Lapwai upon the first report of massacres of citizens by the hostiles, was killed in action at White Bird Cañon, Idaho, June 17. The companies of the regiment rendezvoused at Fort Lapwai, whence they took the field June 22 as part of the column under command of General O. O. Howard. The battalion was commanded by Captain Evan Miles and consisted of Companies B (Captain Jocelyn, Lieut. Bailey), C (Captain Burton, Lieut. Williams), D (Captain Pollock), E (Lieuts. Pierce and Farrow), H (Lieuts. Haughey and Duncan), I (Lieut. Eltonhead). Major Mason, Lieutenants Ebstein (R. Q. M.), Fletcher and Wood served as staff officers to General Howard, and Captain Spurgin commanded a company of hired skilled laborers employed in clearing the difficult mountain trails from fallen timber. The battalion was engaged in action July 11 and 12 at the Clearwater River, where the hostiles, who fought with skill and the utmost obstinacy for two days, were finally driven from their position with heavy loss and compelled to abandon their camp filled with their effects—blankets, buffalo robes and provisions. The loss of the battalion was eight enlisted men killed and Lieutenant Williams and thirteen men wounded. The pursuit of the fleeing Indians was at once taken up and continued with the briefest intermissions for needed rest, from northern Idaho across the continent to within a day's march of the British boundary, where they were finally overtaken by and compelled to surrender to a command under Colonel (now General) Nelson A. Miles. The pursuit of the Nez Percés, under Chief Joseph, stands unequalled in our military annals for distances marched, privations incurred and obstacles encountered and overcome, by foot troops, in pursuit of a wily foe amply supplied with horses and bent upon escape. From the 22d of June to the 10th of October the battalion was on the march.

From Fort Lapwai, Idaho, through the rugged country of the Salmon River, crossing torrents, climbing mountains and threading rocky defiles; over the Lolo trail into Montana, groping through fallen timber and dense undergrowth; through the Bitter Root valley, past the Big Holes to Henry Lake; thence to the Yellowstone River and through the great national park; struggling through the forests and the almost impassable cañons of Clark's Fork, crossing with difficulty the Musselshell, marching through Judith Basin to the Missouri River and beyond this river to the vicinity of Bear Paw Mountain—this was the march of the battalion, a distance of

1632 miles. With insufficient clothing and camp equipage, frequently on reduced rations, the battalion in its march crossed three times the chain of mountains which constitute the great continental divide, and it may be noted, to the credit of the regiment, that during the five months of this trying field service not a single desertion occurred among the enlisted men of these six companies.

Between July 27th and October 10th the battalion had marched, including all halts and stoppages, 1321 miles—or an average of 17.61 miles per day during 75 consecutive days. The troops returned to their stations on the Pacific coast via the Missouri River, Omaha and San Francisco, reaching Vancouver Barracks early in November.

The outbreak of the Bannocks and Pi Utes in June, 1878, called the entire regiment (except Company F) into the field. A detachment of 75 men under Captain Patrick Collins was dispatched at once from Fort Boise to the scene of trouble in southern Idaho. Meanwhile the companies from Vancouver Barracks (B, D, G, H and I) were marching from Umatilla, Oregon, in the direction of Boise City. These were subsequently joined by Companies E and K from Camp Harney. Captain Evan Miles commanded the battalion. Two foot batteries of the Fourth Artillery, under Captain Rodney, and one troop of the First Cavalry under Captain Bendire were added to Captain Miles' command. With this force Captain Miles succeeded in overtaking the hostiles—after a forced march of 35 miles in one day—engaging them on July 13th near Umatilla Agency, Oregon, and putting them to flight. The following officers were present in this engagement: Captains Evan Miles (commanding), Downey, Jocelyn, Spurgin, Boyle, Lieutenants Haughey, Ebstein, Rheem, Cornman, Duncan, Eltonhead, Farrow and Shofner.

After the action at Umatilla the battalion, under Captain Miles, formed part of Colonel Frank Wheaton's command and was occupied in guarding and operating along the Walla Walla-Boise stage road. The battalion was at this time mounted on Indian ponies and remained a mounted command to the close of the campaign in August, when the companies were returned to their posts.

Colonel Sully died at Vancouver Barracks, April 27, 1879. He was succeeded by Colonel Henry A. Morrow, a gallant and meritorious soldier.

Transferred in June, 1884, to the Department of the Platte, the regiment was assigned to stations as follows: Headquarters and C, E, F and G to Fort Sidney, Nebraska; B and I to Fort Steele, D and H to Fort Bridger, A to Fort McKinney, and K to Fort Russell, Wyoming. During July and August, 1885, Companies B, C, F, G, I and K, under command of Major Pearson, were in the field in southern Kansas during a threatened outbreak of the Cheyennes and formed part of Colonel Morrow's command of infantry and cavalry in camp at Crisfield, Kansas. In the fall of the same year Companies C, D and H were in the field at Rock Springs, Wyoming, during the anti-Chinese riots at that place. Companies B, F, I and K, in 1886, established and afterwards were part of the garrison of Fort Duchesne, Utah. In August and September, 1887, Headquarters and five companies under Colonel Morrow were in camp of instruction near Kearney, Ne-

braska; the other five companies under Major Andrews in a similar camp in Strawberry Valley, Utah. For the first time in twenty years the entire regiment, in command of Lieut.-Col. Poland, was assembled for field manœuvres at Camp George Crook, near Fort Robinson, Nebraska, in the summer of 1889.

During the Sioux outbreak in the winter of 1890–91 the regiment was in the field. Lieut.-Col. Poland, in command of Companies A, C, E and G, was ordered to Rosebud Agency, South Dakota, where they remained in camp during the inclement winter. Major Andrews, with companies B, D, F and H, went from Camp Douglas, Utah, to Fort Robinson, Nebraska, where they encamped. Toward the end of January, 1891, the companies (with exception of Company G, which remained at Rosebud Agency) returned to their posts.

Colonel Henry A. Morrow died at Hot Springs, Arkansas, January 30, 1891, and was succeeded by Colonel Richard F. O'Beirne, who, however, did not live to join, as colonel, the regiment he had left in 1879 as a captain. He died in New York City, February 24, 1891. Colonel Joseph S. Conrad was appointed to the command of the regiment as of the latter date, but after a brief period of duty with his new command, died at Fort Randall, South Dakota, December 4. 1891, while on an inspecting tour. The regiment thus lost by death three of its commanders in the brief space of eleven months.

Colonel Horace Jewett succeeded to the command of the regiment and is its present head. In the spring of 1892 Headquarters and five companies were transferred to the Department of the East, and at this date (May, 1892) the regiment is distributed as follows: Regimental Headquarters and Companies A, C and E at Fort Niagara, New York; B and H at Fort Porter, New York; F and I at Fort Randall, South Dakota; G, Fort Sidney, Nebraska.

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CONSTITUTION.

ARTICLE I.—TITLE.

This Society shall be known as the Military Service Institution of the United States.

ARTICLE II.—DESIGN.

The Design contemplates professional unity and improvement by correspondence, discussion, and the reading and publication of Essays, the establishment of a military Library and Museum, and, generally, the promotion of the military interests of the United States.

ARTICLE III.—LOCATION.

The Rooms or Headquarters shall be in the city of New York.

ARTICLE IV.—MEMBERSHIP.

Sec. 1.—All Officers of the Army and Professors of the Military Academy shall be entitled to membership, *without ballot*, upon payment of the entrance fee.

Sec. 2.—Ex-Officers of the Regular Army, of good standing and honorable record, shall be eligible to full membership of the Institution *by ballot* of the Executive Council.

Sec. 3.—Officers of the U. S. Navy and Marine Corps shall be entitled to membership of the Institution, *without ballot*, upon payment of the entrance fee, but shall not be entitled to vote nor be eligible to office.

Sec. 4.—All persons not mentioned in the preceding sections, of honorable record and good standing, shall be eligible to *Associate Membership by a confirmative vote of two-thirds* of the members of the Executive Council present at any meeting. Associate Members shall be entitled to all the benefits of the Institution, including a share in its public discussions; but no Associate Member shall be entitled to vote nor be eligible to office.

Sec. 5.—The President and ex-Presidents of the United States, the Secretary of War, and the General and Lieutenant-General of the Army shall be Honorary Members of the Institution: *Provided* that the two officers last named shall be eligible for full membership.

Sec. 6.—Membership dates from the first day of the calendar year in which the "application" is made, unless such application is made after October 1st, when the membership dates from the first day of the next calendar year. Membership shall be terminated by nonpayment of annual dues for two years.

When any member shall have been dismissed from the Army, Navy, or Marine Corps, by order of the President, or the sentence of a court-martial, or shall have been convicted by a civil court of a felony, his membership shall be forfeited and his name dropped from the rolls of the Institution.

Sec. 7.—An entrance fee of five dollars ($5) shall be paid by each member, and associate member, on joining the Institution, which sum shall be in lieu of the dues for the first year of membership.

The annual subscription shall not be less than two dollars ($2), due January 1st.

The payment of a sum of not less than fifty dollars ($50) shall constitute membership for life.

ARTICLE V.—GOVERNMENT.

Sec. 1.—The Officers of the Institution shall be a President, two Vice-Presidents, who shall reside near the Headquarters, and as many Vice-Presidents, in addition, as may be required to preside over Branches; a Secretary, a Treasurer, a Vice-Treasurer, an Assistant Secretary, and one Corresponding Secretary for each Branch.

Sec. 2.—There shall be an Executive Council, consisting of the officers aforesaid *ex-officio*, and one representative from each Staff-Corps and

Department not represented by a Vice-President; two representatives each from the Cavalry, Artillery and Infantry arms, and one representative from the retired list: *Provided*, that these proportions may be disregarded if, in any case, there should not be officers from all such branches of the Service available.

The ex-officers of the regular army who are members of the Military Service Institution shall have one representative in the Executive Council; but no ex-officer of the regular army shall be eligible as a representative from or of any staff corps, department, or branch, of the military service of the United States.

The affairs of the Institution shall be conducted by the Executive Council which may make such By-Laws, not inconsistent with this Constitution, as may seem necessary.

Five members of the Council shall constitute a quorum.

The Executive Council, by a majority vote of the meeting, may fill *for the unexpired terms*, all vacancies which occur among its members.

Sec. 3.—The President and Executive Council shall be elected by the Members of the Institution, at a General Meeting to be held biennially, on the second Wednesday in January, or as soon thereafter as practicable. Six members of the Council shall go out biennially, by rotation, but may be eligible for re-election.

Sec. 4.—The Resident Vice-Presidents, Secretary, Treasurer, Assistant Secretary and Vice-Treasurer shall be elected biennially by the Council, on the last Wednesday in January, or as soon thereafter as practicable, two-thirds of the Council voting.

Sec. 5.—Five members of the Council, to be appointed by the Chairman, shall constitute a Committee on Publication and Essays. It shall be the duty of that Committee to examine all papers submitted to it by the Council, and report the disposition which, in its judgment, should be made of them and to recommend to the Council, for publication, the Essays which the Committee may deem most suitable for that purpose.

The preparation of manuscript for publication, as well as the transaction of all business connected with printing and publishing and the editing of the JOURNAL, shall be done under the direction and supervision of the Committee on Publication and Essays, subject to the control of the Council. Three members of the Committee shall constitute a quorum.

Sec. 6.—The Council may appoint Corresponding Members of Council, and shall prescribe their duties.

ARTICLE VI.—MEETINGS.

A general meeting shall be held on the second Wednesday in January annually, at which the regular report of the Executive Council shall be presented.

The Council may call a General Meeting, at ten days' notice, by informing members individually, as far as practicable, and by such public notice as the Council may direct.

ARTICLE VII.—JOURNAL.

A Journal of the Transactions of the Institution shall be kept by the

Secretary; and as often as it may be deemed advisable by the Council, the Journal shall be published and distributed to members, free of expense.

Surplus copies may be sold under the regulations of the Council.

ARTICLE VIII.—BRANCHES.

Sec. 1.—Branches of the Military Service Institution may be established where the membership is sufficiently large to warrant a local organization.

Sec. 2.—The officers of a Branch shall consist of a presiding officer, and of a secretary and treasurer. The former shall be *ex-officio*, a Vice-President, and the latter a Corresponding Secretary of the Institution.

These officers shall be elected by the Branch, at a meeting held, annually, on the second Wednesday in January, or as soon thereafter as practicable. Vacancies shall be filled, at special meetings, for unexpired terms only.

Sec. 3.—It shall be the duty of the Corresponding Secretary to keep a Roster of membership, minutes of proceedings at the meetings, to serve notices upon the members, and to correspond with the Secretary of the Institution, keeping him informed of all changes in membership, and of all business relating to the Institution. He shall also forward papers read before, or submitted to the Branch, with a view to a selection by the Publication Committee for insertion in the JOURNAL; and shall arrange with the Quartermaster's Department for the transportation of articles intended for the Library and Museum.*

Sec. 4.—It shall be the duty of the Corresponding Secretary to collect from the members of the Branch their annual dues to the Institution; and, after deducting the necessary expenses of the Branch for stationery, postage, and, when needful, for warming and lighting the Assembly Room, to forward the balance to the Treasurer of the Institution. This remittance shall be made quarterly, with a detailed statement of all moneys received and expended, and vouchers for the expenditures.

Sec. 5.—Branches may hold such meetings, and under such regulations as may be decided upon by the local membership.

ARTICLE IX.—CHANGES IN THE CONSTITUTION.

Changes may be made in the Constitution at any General Meeting, by an affirmative vote of two-thirds of the members of the Institution voting: *Provided*, that due notice of said meeting shall have been mailed to each member and posted in the rooms of the Institution at least sixty (60) days prior to said meeting; and *provided* further, that absent members may vote by proxy.

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* The Quartermaster's Department is authorized to receive from officers and other persons, and forward to their respective destinations (under the regulations governing the transportation of military property and on the same form of bills of lading) articles donated by persons to * * the Library and Museum of the Military Service Institution at Governor's Island, N. Y. Packages to be marked, "Military Service Institution of the United States, care of Depot Quartermaster, New York, N. Y. (*Extract from Army Regulations.*)

BY-LAWS.

No. 1. Prize Essay.—That a Prize of a Gold Medal of suitable value, together with a Certificate of Life Membership, shall be offered annually by The Military Service Institution of the United States for the best essay on a military topic of current interest; the subject to be selected by the Executive Council and the Prize awarded under the following conditions:

(*a*) Competition to be open to all persons eligible to membership.

(*b*) Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before* (date to be specified). The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

(*c*) The prize shall be awarded upon the recommendation of a Board, consisting of three suitable persons, chosen by the Executive Council, who will be requested to designate the Essay deemed worthy of the prize; and also, in their order of merit, those deserving of honorable mention.

(*d*) The successful Essay shall be published in the Journal of the Institution and the Essays deemed worthy of honorable mention, shall be read before the Institution or published, at the discretion of the Council.

(*e*) Essays must not exceed twenty thousand words, or fifty pages of the size and style of the Journal (exclusive of table). *R. March 1, 1880—Amended 1888.*

2. Finance Committee.—That the President of the Council shall appoint three members to constitute a Committee on Finance, Expenditures and Accounts, and that it be the duty of said Committee (subject to the Council) to raise funds, supervise collections, audit accounts, and to control expenditures, provided that the aggregate expenditures shall at no time exceed five hundred dollars until the approval of the Council shall have been obtained. *R. June 6, 1882.*

3. Permanent Fund.—That all money which may be received in payment for Life Membership, and as soon as practicable, all moneys which may have been received, together with such sums as the Council may from time to time direct, will be set apart as a Permanent Fund, to be invested by the Treasurer under the direction of the Finance Committee, and only the income therefrom shall be available for expenditure. *R. June 6, 1882.*

4. Foreign Correspondents.—That the President shall be authorized to invite suitable persons to act as Foreign Correspondents of Council, and otherwise aid in promoting the purposes of the Institution. *R. April 1, 1884.*

5. Associate Members.—That hereafter each applicant for Associate Membership shall be proposed and seconded by a member or associate member. *R. Jan. 30, 1886.*

6. The Journal.—That an invitation to read a paper before the Mili-

tary Service Institution, or a request for a copy of the manuscript in a resolution of thanks, after the reading of such paper, shall not be construed to imply that it will be printed in the JOURNAL. The space is limited, and the Publication Committee is held responsible that it is filled to the best advantage from all material on hand. To this end the Committee is empowered to use its discretion in the selection of articles, and in the elimination from any article, so selected, of whatever shall seem objectionable from whatever cause.

(*a*) That the printing of monographs in advance of, or in lieu of a regular appearance in the JOURNAL, be discontinued, but that the Publication Committee be authorized to print, in pamphlet form, extra copies of such articles as are likely to command a sale in that shape.

(*b*) That the price of the JOURNAL be raised from fifty cents to seventy-five cents per copy. *R. May 12, 1888.*

(*c*) Hereafter the JOURNAL shall be published *bi-monthly*. *R. Jan. 30, 1889.*

7. BRANCHES.—A membership of at least ten is required for the establishment of a branch. *R. March 29, 1889.*

Register of Membership.

Revised to Include June 1, 1892.

Annual subscribers (non-members) are not included in this list.
The highest brevet rank follows (in parenthesis) the actual rank.
Life members are indicated by a star (*) before their names.

HONORARY MEMBERS.

THE PRESIDENT OF THE UNITED STATES,
RUTHERFORD B. HAYES, ex-President of the United States,
GROVER CLEVELAND, ex-President of the United States,
THE SECRETARY OF WAR.

MEMBERS.

Abbot, Charles W., jr., 1 lt. 12 inf.
Abbot, Frederic V., capt. eng.
Abbot, Henry L., col. eng. (B. G.)
Adair, Samuel E., 1 lt. 5 cav.
Adam, Emil, maj. 6 cav.
Adams, Granger, 1 lt. 5 art.
Adams, Henry H., capt. 18 inf.
Adams, Thomas R., 1 lt. 5 art.
Ahern, George P., 1 lt. 25 inf.
Alden, Charles H., lt. col. med. dept.
Alexander, Robert, 2 lt. 7 inf.
Allen, Charles J., maj. eng.
Allen, Henry T., 1 lt. 2 cav.
Allen, Leven C., capt. 16 inf.
Allen, Samuel E., 1 lt. 5 art.
Allison, James N., 1 lt. 2 cav.
Alvord, Benjamin, 1 lt. 20 inf.
Anderson, George S., capt. 6 cav.
Anderson, James T., 1 lt. 25 inf.
Anderson Robert H., 1 lt. 9 inf.
Anderson, Thomas M., col. 14 inf.
Andrews, Avery D., 2 lt. 5 art.

Andrews, George, 1 lt. 25 inf.
*Andrews, George L., col. ret.
*Andrews, George L., prof. mil. acad.
Andrews, Henry M., 1 lt. 1 art.
Andrus, Edwin P., 1 lt. 5 cav.
Andruss, E. Van Arsdale, capt. 1 art.
Anglum, Daniel F., 1 lt. 12 inf.
Appel, D. M., capt. asst. surg.
Armstrong, Robert G., capt. 1 inf.
Arnold, Abraham K., col. 1 cav.
Arnold, Isaac, jr., maj. ord. dept.
Arthur, William, maj. pay dept.
Augur, Chris. C., B. G. ret. (M. G.)
Augur, Colon, capt. 2 cav.
Avis, Edward S. 1 lt. 18 inf.
Ayres, James C., capt. ord. dept.
Babbitt, Edwin B., 1 lt. ord. dept.
Babbitt, Lawrence S., lt. col. ord.
Babcock, John B., capt. 5 cav. (maj.)
Bailey, Harry L., 1 lt. 21 inf.
Bailey, Hobart, K., 1 lt. 5 inf.
Bainbridge, Aug. H., capt. 14 inf.
Baird, William, capt. 6 cav.
Baker, Chauncey B., 2 lt. 7 inf.
Baker, Stephen, capt. 6 inf.
Baldwin, Frank D., capt. 5 inf.
Baldwin, James H., capt. 18 inf.
Ballance, John G., capt. 22 inf.
Bankhead, Henry C., maj. ret. (B.G.)
Barber, Henry A., 2 lt. 1 cav.
Barlow, John W., lt. col. eng.
Barney, George F., 1 lt. 2 art.
Barnum, Malvern-Hill, 2 lt. 3 cav.
Barr, Thos. F., lt. col. j. a. gen. dept.
Barrette, John D., 2 lt. 3 art.
Barriger, J.W., lt. col. sub.dept.(B.G.)
Barry, Thomas H., capt. 1 inf.
Barstow, George F., capt. ret. (maj.)
Barth, Charles H., 1 lt. 12 inf.
Bartlett, George T. 1 lt. 3 art.
Barton, Frank A., 2 lt. 24 inf.
*Bass, Edgar W., prof. mil. acad.
Batchelder, R. N., brig. gen. qm. gen.
Batchelor, Joseph B., jr., 1 lt. 24 inf.
Bates, Alfred E., maj. pay dept.
Bates, James A., capt. ret. (lt. col.)
*Bates, John C., col. 2 inf.
Baylies, James, 2 lt. 5 inf.
Beach, Francis H., 2 lt. 6 cav.
Beach, Lansing H., 1 lt. eng.
Beach, William D., 1 lt. 3 cav.
Beall, Fielder M. M., 1 lt. 18 inf.
Beardsley, Joseph C., 2 lt. 8 inf.
Beaumont, Eugene B., lt. col. ret.
Beck, William B., capt. ret. (lt. col.)
Beckurts, Charles L., 1 lt. 6 inf.
Bellinger, John B., 1 lt. 5 cav.
Benét, J. Walker, 1 lt. ord. dept.
Benét, S. V. brig. gen. retired.
Benham, Henry H., 1 lt. 2 inf.
Benjamin, Everett E., 1 lt. 1 inf.
Bennett, Charles A., 1 lt. 3 art.
Bennett, Clarence E., capt. 17 inf.
Bennett, William C., 2 lt. 6 inf.
Benteen, Fred. W., maj. retired (col.)
Bentzoni, Chas., maj. 1 inf. (lt. col.)
Benyaurd, Wm. H. H., lt. col. eng.
Bergland, Eric, capt. eng.
Bernard, Reuben F., maj. 8 cav. (col.)
Berry, Lucien G., 2 lt. 4 art.
Best, Clermont L., col. retired.
Best, Clermont L., jr., 1 lt. 1 art.
Biddle, John, 1 lt. eng.
Biddle, William S., jr., 1 lt. 14 inf.
Bigelow, John, jr., 1 lt. 10 cav.
Bingham, Gonzalez S., 1 lt. 9 cav.
Bingham, Judson D., col. qm. dept. (B. G.)
Bingham, Theodore A. capt. eng.
Bird, Charles, capt. qm. dept. (lt. col.)
Birkhimer, William E., 1 lt. 3 art.
Birmingham, Henry P., capt. asst. surg.
Birnie, Rogers, jr., capt. ord. dept.
Bisbee, William H., capt. 4 inf.
Bishop, Hoel S., 1 lt. 5 cav.
Bishop, John S., capt. 13 inf.
*Bixby, William H., capt. eng.
Black, William M., capt. eng.
Blake, Edmund M., 2 lt. 5 art.
Bliss, Tasker H., 1 lt. 1 art.
Bliss, Zenas R., col. 24 inf.
Blocksom, Augustus P., 1 lt. 6 cav.
Blunt, Albert C., 1 lt. 5 art.

Blunt, Charles E., col. retired.
Blunt, Matthew M., col. 16 inf.
Blunt, Stanhope E., capt. ord. dept.
Boehm, Peter M., capt. retired.
Borden, George P., capt. 5 inf.
Boughton, Daniel H., 1 lt. 3 cav.
Boutelle, Frazier A., capt. 1 cav.
Bowen, Edgar C., capt. retired.
Bowen, William H. C., 1 lt. 5 inf.
Bowman, Alpheus H., capt. 9 inf.
Boyle, William H., capt. 21 inf.
Braden, Charles, 1 lt. retired.
Bradford, James H., maj. 11 inf.
Brady, George K., lt. col. 17 inf.
Brainard, David L., 2 lt. 2 cav.
Brannan, John M., col. ret. (M. G.)
Brayton, George M., col. 19 inf.
Breck, Samuel, lt. col. a. g. dept. (B. G.)
*Breckinridge, J. C., B. G. ins.gen.
Brett, James E., 1 lt. 24 inf.
*Brewerton, Henry F., capt. 5 art.
Bridgman, Victor H., 1 lt. 2 art.
Brincklé, John R., capt., 5 art. (maj.)
Bronson, Nelson, 1 lt. retired.
Brooke, John, maj. med. dept.
Brooke, John R., brig. gen.
Brooks, Edward C., 2 lt. 8 cav.
Brooks, John C. W., 1 lt. 4 art.
Brown, Austin H., 1 lt. 4 inf.
Brown, Edward T., 1 lt. 5 art.
Brown, Hugh G., capt. 12 inf. (maj.)
Brown, Nathan W., brig. gen. retired.
Brown, Oscar J., 1 lt. 1 cav.
Brown, William C., 1 lt. 1 cav.
Brumback, Virgil J., 1 lt. 2 inf.
Brush, Daniel H., capt. 17 inf.
Buchanan, James A., capt. 14 inf.
Buck, Beaumont B., 1 lt. 19 inf.
Budd, Otho W., capt. retired.
Bullis, John L., capt. 24 inf.
Bundy, Omar, 1 lt. 3 inf.
Burbank, James B., capt. 3 art.
Burke, Daniel W., capt. 14 inf. (maj.)
Burnett, George R., 1 lt. retired.
Burnett, Levi F., capt. 7 inf.
Burnham, Horace B., lt. col. retired.
Burnham, William P., 1 lt. 6 inf.
Burr, Edward, 1 lt. eng.
Burr, George W., 2 lt. 1 art.
Burton, G. H., lt. col. ins. gen. dept.
Burton, H. G., capt. retired,
Bush, Edward G., col. 25 inf.
Bush, James C., 1 lt. 5 art.
Butler, Edmond, lt. col. retired.
Butler, John G., maj. ord. dept.
Butler, John H. capt. retired. (maj.)
Buttler, William C., 1 lt. 3 inf.
Byrne, Bernard A., 1 lt. 6 inf.
Byrne, Charles, 1 lt. 6 inf.
Byrne, Charles C., lt. col. med. dept.
Cabaniss, Archibald A., 2 lt. 20 inf.
Cabell, Henry C., 1 lt. 14 inf.
Caldwell, Daniel G., maj. med. dept.
Calef, John H., capt. 2 art. (maj.)
Califf, Joseph M., 1 lt. 3 art.
Cameron George H., 1 lt. 4 cav.
Campbell, Archibald, 2 lt. 3 art.
Campbell, George J., 1 lt. retired.
Canby, James P., maj. pay dept.
Carbaugh, Harvey C., 1 lt. 5 art.
Carey, Asa B., maj. pay dept. (lt. col.)
Carleton, Guy, 1 lt. 2 cav.
Carlton, Caleb H., col. 8 cav.
Carpenter, Gilbert S., capt. 14 inf.
Carpenter, Louis H., maj. 5 cav. (col.)
Carr, Camillo C. C., maj. 8 cav.
Carr, Eugene A., col. 6 cav. (M. G.)
Carrington, Henry B., col. retired.
Carroll, Henry, maj. 1 cav.
Carson, John M., jr., 1 lt. 5 cav.
Carter, Oberlin M., capt. eng.
Carter, William H., capt. 6 cav.
Cartwright, George S., 1 lt. 16 inf.
Castner, Joseph C., 2 lt. 4 inf.
Catlin, Edward H., 1 lt. 2 art.
Catlin, Robert, capt. retired.
Caziarc, Louis V., capt. 2 art.
Chaffee, Adna R., maj. 9 cav.
Chamberlin, John L., 1 lt. 1 art.
Chandler John G., lt. col. qm. dept. (col.)
Chapin, A. R., capt. asst. surg.
Chase, Constantine, capt. qm. dept.
Chase, Wilson, 2 lt. 20 inf.
Chester, James, capt. 3 art.

Chipman, Henry L., lt. col. retired.
Chubb, Charles St. J., 1 lt. 17 inf.
Churchill, Charles A., 1 lt. 5 inf.
Clagett, J. Rozier, 1 lt. 23 inf.
Clague, John J., capt. sub. dept.
Clapp, William H. capt. 16 inf.
Clark, Charles H., capt. ord. dep.
Clark, Hollis C., 2 lt. 23 inf.
Clark, Joseph C., jr., maj. ret. (col.)
Clark, Sidney E., capt. 2 inf.
Clark, Wallis O., 1 lt. 12 inf.
Clark, William F., 2 lt. 7 cav.
Clarke, Charles J. T., 1 lt. 10 inf.
Clarke, Powhatan H., 1 lt. 10 cav.
Clayton, Paul, jr., 2 lt. 5 cav.
Clem, John L., capt. qm. dept.
Clendenin, P., capt. asst. surg.
Cloman, Sydney A., 2 lt. 1 inf.
Closson, Henry W., col. 4 art.
Clous, John W., lt. col. j. a. gen. dept.
Coates, Edwin M., maj. 19 inf.
Cochran, Charles H., 1 lt. 7 inf.
Cochran, Melville A., col. 6 inf.
Coffin, William H., 1 lt. 5 art.
Collins, Charles L. 1 lt. 11 inf.
Comba, Richard, maj. 9 inf.
Comegys, William H., maj. pay dept.
Comly, Clifton, maj. ord. dept.
Compton, Charles E., col. 4 cav.
Comstock, Cyrus B., col. eng. (B.G.)
Conklin, John, jr., 1 lt. 2 art.
Conrad, Casper H., capt. 15 inf.
Conway, Edwin J., capt. retired.
Conway, William, capt. 22 inf.
Cooke, George F., 1 lt. 15 inf.
Cooke, Lorenzo W., 1 lt. 3 inf.
Cooke, P. St. G., B. G. ret. (M. G.)
Coolidge, Charles A., capt. 7 inf.
Cooney, Michael, maj. 4 cav.
Coppinger, John J., col. 23 inf.
Corbin, Henry C., lt. col. a. g. dept.
Corliss, Augustus W., capt. 8 inf.
Cornish, George A., capt. 15 inf.
Cotter, John, 1 lt. 15 inf.
Cotton, Gilbert P., capt. 1 art.
Cowles, Calvin D., capt. 23 inf.
Cowles, Warren H., 1 lt. 16 inf.
Coxe, Frank M., maj. pay dept.
Crabb, George W., capt. 5 art.
Craig, Louis A., capt. 6 cav.
Craighill, William E. 1 lt. eng.
Craighill, William P., col. eng.
Crandal, Fred. M., capt. 24 inf. (lt. col.)
Crawford, Alex. McL., 1 lt. retired.
Crawford, Charles, 2 lt. 10 inf.
Crawford, Medorem, jr., 1 lt. 2 art.
Crawford, S. W., brig. gen. ret. (M.G.)
Cree, John K., 2 lt. 3 art.
Crittenden, John J., 1 lt. 22 inf.
Crittenden, T. L., col. ret. (B. G.)
Crofton, Robert E. A., col. 15 inf.
Crowder, Enoch H., 1 lt. 8 cav.
Crowell, William H. H., capt. 6 inf.
Crowley, Matthias, 2 lt. 5 inf.
Croxton, Richard C., 2 lt. 5 inf.
Crozier, William, capt. ord. dept.
Cruse, Thomas, 1 lt. 6 cav.
Cummins, Albert S., 1 lt. 4 art.
Curtis, Edwin S. 1 lt. 2 art.
Cushing, Harry C., capt. 4 art. (maj.)
Cushing, Samuel T., maj. sub. dept.
Cushman, Herbert, 1 lt. retired.
Cusick, Cornelius C., capt. retired.
Dana, James J., lt. col. retired. (B.G.)
Dandy, G. B., lt. col. qm. dept. (B. G.)
Danes, Henry, C., 1 lt. 3 art.
Daniel, Lunsford, 2 lt. 6 cav.
Darling, John A., capt. 1 art. (maj.)
Dashiell, William R., 2 lt. 17 inf.
Daugherty, Will W., capt. 22 inf.
Davis, Charles E. L. B., maj. eng.
Davis, Charles L., capt. 10 inf. (maj.)
Davis, Edward, 1 lt. 3 art.
Davis, George B., 2 lt. 23 inf.
Davis, George W., capt. 14 inf.
Davis, Richmond P., 2 lt. 2 art.
Davis, Thomas F., capt. 15 inf.
Davis, Wm. B., capt. asst. surg.
Davis, Wirt, maj. 5 cav.
Day, Matthias W., capt. 9 cav.
Day, Selden A., capt. 5 art.
Dean, James T., 2 lt. 3 inf.
Deems, Clarence, 1 lt. 4 art.
De Loffre, A. A., capt. asst. surg.
Dempsey, Charles A., capt. 2 inf.

*Derby, George McC., capt. eng.
De Russey, Isaac D., col. 11 inf.
Detchmendy, George A., 2 lt. 6 inf.
Devol, Carroll A., 1 lt. 25 inf.
De Witt, Calvin, maj. med. dept.
Dimmick, Eugene D., capt. 9 cav.
Dodds, Frank L., 1 lt. 9 inf.
Dodge, Francis S., maj. pay dept.
Dodge, Richard I., col. retired.
Dodge, Theodore A., capt.ret.(lt.col.)
Donaldson, Thos. Q., jr., 2 lt. 7 cav.
Donworth, Albert D., 2 lt. 14 inf.
Dorst, Joseph H., capt. 4 cav.
Doubleday, Abner, col. ret. (M. G.)
Dougherty, William E., capt. 1 inf.
Drew, Alfred W., 2 lt. 12 inf.
Druien, James L., 2 lt. 17 inf.
Drum, William F., lt. col. 12 inf.
DuBarry,Beekman,brig.gen.com.gen
Dudley, Edgar S., 1 lt. 2 art.
Dudley, Nathan A. M., col. retired.
Duff, Robert J., 1 lt. 8 cav.
Duggan, Walter T., capt. 10 inf.
Duncan, George B., 2 lt. 9 inf.
Duncan, Joseph W., capt. 21 inf.
Dunn, Beverly W., 1 lt. ord. dept.
Dunning, Samuel W., 1 lt. 16 inf.
Duval, J. Harry, 1 lt. 18 inf.
Duvall, William P., 1 lt. 5 art.
Dwyer, Charles G., 2 lt. 21 inf.
Eakin, Chandler P., capt. ret. (maj.)
Eastman, Frank F., 1 lt. 14 inf.
Ebert, R. G., capt. asst. surg.
Ebstein, Fred'k H. E., capt. 21 inf.
Eckerson, Theodore H., 1 lt. 19 inf.
Eckerson, Theodore J., maj. retired.
Edgerton, Wright P., 1 lt. 2 art.
Edie, Guy L., capt. asst. surg.
Edmunds, Frank H., capt. 1 inf.
Edwards, Clarence R., 1 lt. 23 inf.
Egbert, Harry C., maj. 17 inf.
Elderkin, William A., maj. sub.dept.
Eldridge, Bogardus, 1 lt. 10 inf.
Elliot, George H., lt. col. eng.
Elliot, William G., 2 lt. 9 inf.
Elliott, Charles P., 1 lt. 4 cav.
Elliott, Stephen H., 2 lt. 5 cav.
Ellis, Wilmot E., 2 lt. 5 art.
Eltonhead, Francis E., 1 lt. 21 inf.
Emery, Jonas A., 1 lt. 11 inf.
Ernst, Oswald H., maj. eng.
Eskridge, Richard I., capt. 23 inf.
Evans, Robert K., 1 lt. 12 inf.
Ewers, Ezra P., capt. 5 inf.
Farley, Joseph P., lt. col. ord. dept.
Farnsworth, Charles S., 2 lt. 25 inf.
Febiger, Lea, 1 lt. 23 inf.
Fenton, Charles W., 2 lt. 7 cav.
Fessenden, Joshua A., capt. 5 art.
Fiebeger, Gustav J., capt. eng.
Finley, Walter L., capt. 9 cav.
Fisher, W. W. R., capt. asst. surg.
Fisk, Walter L., capt. eng.
Fitch, Graham D., 1 lt. eng.
Fitch, William G., 1 lt. retired.
Fletcher, Joshua S., lt. col. retired.
*Floyd-Jones, De Lancey, col. ret.
Flynn, William F., 1 lt. 8 cav.
Foltz, Frederick S., 1 lt. 1 cav.
Foote, Morris C., capt. 9 inf.
Foote, Stephen M., 1 lt. 4 art.
Forbes, Theodore F., capt. 5 inf.
Forbush, William C., capt. 5 cav.
Fornance, James, capt. 13 inf.
Forsyth, Geo. A., lt. col. ret. (B. G.)
Forsyth, James W., col. 7 cav. (B. G.)
Forsyth, William W., 1 lt. 6 cav.
Foster, Arthur B., 2 lt. 19th inf.
Foster, Charles W., maj. ret. (col.)
Foster, Charles W., 1 lt. 3 art.
Foster, Herbert S., capt. 20 inf.
Fountain, Samuel W., capt. 8 cav.
Fowler, Joshua L., capt. 2 cav.
Frank, Royal T., lt. col. 2 art.
Freeland, Harry, 2 lt. 3 inf.
Freeman, Samuel D., 1 lt. 10 cav.
French, Francis H., 1 lt. 19 inf.
French, George E., 2 lt. 4 inf.
French, John T., jr. 1 lt. 4 art.
Frier, James H., 2 lt. 17 inf.
Frost, Alfred S., 1 lt. 25 inf.
*Fry, James B., col. retired. (M. G.)
Fuger, Frederick, capt. 4 art.
Fuger, Frederick W., 2 lt. 13 inf.
Fuller, Alfred M., 1 lt. 2 cav.
Fuller, Ezra B., capt. 7 cav.

Gageby, James H., capt. 3 inf.
Galbraith, William W., 1 lt. 5 art.
Gale, George H. G., 1 lt. 4 cav.
Gallup, Charles C., 2 lt. 5 art.
Gardener, Cornelius, capt. 19 inf.
Gardiner, Asa Bird, maj. retired.
Gardner, William H., maj. med. dept.
Garrard, Joseph, capt. 9 cav.
Gatchell, George W., 2 lt. 4 art.
Gayle, Edward E., 1 lt. 2 art.
Getty, George W., col. ret. (M. G.)
Getty, Robert N., 1 lt. 22 inf.
*Gibbon, John, brig. gen. retired. (M. G.) ***Prize Essayist, 1880.***
Gibson, Joseph R., maj. med. dept. (lt. col.)
Gibson, William W., 1 lt. ord. dept.
Gilbreath, Erasmus C., capt. 11 inf.
Gillespie, George L., lt. col. eng.
Gilman, Benjamin H., capt. 13 inf.
Girard, Alfred C., maj. med. dept.
Glasgow, William J., 2 lt. 1 cav.
Glassford, William A., 1 lt. sig. corps.
Glenn, George E., maj. pay dept.
*Godfrey, Edward S., capt. 7 cav.
Godfrey, George J., 2 lt. 12 inf.
Goe, James B., 1 lt. 13 inf.
*Goldman, Henry J., 1 lt. 5 cav.
*Goodale, Greenleaf A., capt. 23 inf.
Goodin, James A., 1 lt. 7 inf.
Goodloe, Archibald H., capt. retired.
Gordon, David S., lt. col. 2 cav.
Gordon, Walter H., 2 lt. 12 inf.
Gordon, William B., capt. ord. dept.
Gose, Ernest B., 2 lt. 8 inf.
*Gould, William P., maj. retired.
Graham, William M., col. 5 art. (B.G.)
Greble, Edwin St. J., 1 lt. 2 art.
Green, John, lt. col. retired.
Greene, Charles H., capt. 17 inf.
Greene, Frank, 1 lt. sig. corps.
Greene, Lewis D., 1 lt. 7 inf.
Greene, Oliver D., lt. col. a. g. dept. (B. G.)
Greenough, George G., capt. 4 art.
Greer, John E., capt. ord. dept.
Gregg, John C., 2 lt. 16 inf.
Gregory, James F., maj. eng.
Grierson, Charles H., 1 lt. 10 cav.
Grimes, George S., capt. 2 art.
Grisard, John S., 2 lt. 13 inf.
Groesbeck, S. W., maj. j. a. gen. dept.
Grugan, Frank C., capt. 2 art.
Grumley, Edward I., 1 lt. 17 inf.
Guenther, F. L., lt. col. 5 art. (col.)
Gurovits, Odon, 2 lt. 11 inf.
Guthrie, John B., capt. 13 inf.
Haan, William G., 2 lt. 5 art.
Hackney, Stephen M., 2 lt. 16 inf.
*Haden, John J., 1 lt. 8 inf.
Hagner, Peter V., col. ret. (B. G.)
Hains, Peter C., lt. col. eng.
Hale, Harry C., 1 lt. 20 inf.
Hale, Joseph, capt. 3 inf.
Hall, Charles S., 1 lt. 13 inf.
Hall, Robert H., lt. col. 6 inf.
Hall, William P., capt. 5 cav.
Hall, Wm. R., capt. asst. surg.
Haller, Granville O., col. retired.
Hamilton, James, 2 lt. 3 art.
Hamilton, John, col. retired.
Hamilton, Samuel T., capt. 2 cav.
Hamilton, William R., 1 lt. 5 art.
Hammond, Andrew G., 1 lt. 8 cav.
Hammond, W. A., brig. gen. retired.
Hancock, William F., 1 lt. 5 art.
Handbury, Thomas H., maj. eng.
Hannay, John W., capt. 3 inf.
Harbach, Abram A., capt. 20 inf.
Hardie, Francis H., capt. 3 cav.
Hardin, Charles B., 1 lt. 18 inf.
Hardin, Edward E., 1 lt. 7 inf.
Hardin, Martin D., brig. gen. ret.
Harding, Chester, 2 lt. eng.
Harlow, Frank S., 1 lt. 1 art.
Harmon, Millard F., 1 lt. 1 art.
Harris, Floyd W., 2 lt. 4 cav.
Harris, Henry L., 1 lt. 1 art.
Harris, Moses, capt. 1 cav.
Harrison, George F. E., 1 lt. 2 art.
Hasbrouck, Alfred, jr., 1 lt. 14 inf.
Hasbrouck, Henry C., maj. 4 art.
*Haskell, Joseph T., capt, 23 inf.
Haskin, William L., maj. 1 art.
Hasson, Patrick, capt. retired.
Hatch, John P., col. retired (B. G.).

Hatfield, Charles A. P., capt. 4 cav.
Hathaway, Forrest H., capt. qm. dept.
Havard, Valery, maj. med. dept.
Hawkins, Hamilton S., lt. col. 23 inf.
Hawkins, J. P., col. sub. dept. (M. G.)
Hawthorne, Harry L., 1 lt. 4 art.
Hay, Leonard, capt. retired.
Hay, William H., 2 lt. 3 cav.
Head, George E., lt. col. retired.
Heard, John W., 1 lt. 3 cav.
Hearn, Lawrence J., 1 lt. 21 inf.
Heath, Frank, capt. ord. dept.
Heavey, John W., 2 lt. 5 inf.
Heger, Anthony, col. med. dept.
Hein, Otto L., capt. 1 cav.
Heistand, Henry O. S., capt. 11 inf.
Heizmann, C. L., maj. med. dept.
Helmick, Eli A., 2 lt. 4 inf.
Hennisee, Argalus G., capt. 8 cav.
Henry, Guy V., lt. col. 7 cav. (col.)
Hersey, Mark L., 2 lt 9 inf.
Hess, Frank W., capt. 3 art.
Heuer, William H., maj. eng.
Heyl, Edward M., col. ins. gen. dept.
Hickey, James B., capt. 8 cav.
Hill, Rowland G., 1 lt. 20 inf.
Hills, Elbridge R., 1 lt. 5 art.
Hinds, Ernest, 2 lt. 2 art.
Hinks, Edward W., col. ret. (B. G.)
Hirst, Robert L., 1 lt. 11 inf.
Hobbs, Charles W., 1 lt. 3 art. (capt.)
Hodges, Charles L., capt. 25 inf.
Hodges, Henry C., jr., 1 lt. 22 inf.
Hodgson, Frederick G., 1 lt. 6 cav.
Hoff, J. Van R., maj. med. dept.
Hoffman, William, capt. 11 inf.
Hogarty, William P., 2 lt. retired.
Holabird, S. B., brig. gen. retired.
Holbrook, Willard A., 1 lt. 7 cav.
Honeycutt, John T., 1 lt. 1 art.
Hooton, Mott, capt. 22 inf.
Hoppin, Curtis B., 1 lt. 2 cav.
Hoskins, John D. C., 1 lt. 3 art.
Hough, Alfred L., col. retired.
Hovey, Henry W., 1 lt. 24 inf.
Howard, Douglas A., 1 lt. ord. dept.
Howard, Guy, 1 lt. 12 inf.
Howard, John, 2 lt. 19 inf.
Howard, Oliver O., maj. gen.
Hoyt, Charles H., major, retired.
Hoyt, George S., capt. qm. dept.
Hubbard, Elmer W., 2 lt. 1 art.
Hubbell, Henry W., capt. 1 art.
Hudson, E. McK., maj. ret. (lt. col.)
Huggins, Eli L., capt. 2 cav.
Hughes, James B., 1 lt. 10 cav.
Hughes, Martin B., capt. 9 cav.
Hughes, R. P., col. ins. gen. dept.
Hughes, William N., 1 lt. 13 inf.
Hunt, Henry J., 2 lt. 15 inf.
Hunter, Alfred M., 2 lt. 4 art.
Hunter, Charles H., 1 lt. 1 art.
Hunter, Edward, maj. j. a. gen. dept.
Hunter, George K., capt. 3 cav.
Huntt, George G., col. 2 cav.
Huston, Joseph F., capt. 20 inf.
Hutcheson, Grote, 1 lt. 9 cav.
Hyde, John McE., capt. qm. dept.
Ilsley, Charles S., maj. 9 cav.
Ingalls, Charles H., capt. qm. dept.
Ingalls, James M., capt. 1 art.
Irvine, Robert J. C., 1 lt. 11 inf.
Jackson, Allan H., capt. 7 inf. (maj.)
Jackson, Harold L., 2 lt. 15 inf.
Jackson, James, maj. 2 cav.
Jackson, James B., 1 lt. 7 inf.
Jackson, R. H., lt. col. 4 art. (B. G.)
Jackson, William P., 2 lt. 24 inf.
Jamar, Mitchell F., 1 lt. 13 inf.
James, William H. W., capt. 24 inf.
Janeway, J. H., maj. med. dept. (lt. col.)
Jervey, Henry, 1 lt. eng.
Jewett, Horace, col. 21 inf.
Jocelyn, Stephen P., capt. 21 inf.
Johnson, Carter P., 1 lt. 10 cav.
Johnson, Charles A., capt. retired.
Johnson, David D., 1 lt. 5 art.
Johnson, Lewis, capt. 24 inf. (lt. col.)
Johnson, John A., 1 lt. 8 cav.
Johnson, William H., lt. col. retired.
Johnson, William H., jr., 1 lt. 16 inf.
Jones, Francis B., capt. qm. dept.
Jones, Frank B., 1 lt. 22 inf.
Jones, Samuel R., capt. qm. dept.
Jones, Thaddeus W., capt. 10 cav.

Jones, William A., maj. eng.
Jordan, Sidney S., 2 lt. 5 art.
Judd, Edwin D.. maj. retired.
Judson, William V., 2 lt. eng.
Kauffman, Albert B., maj. retired.
Kautz, August V., B. G. ret. (M. G.)
Kell, William H., capt. 22 inf.
Kelley, Joseph M., capt. 10 cav.
Kellogg, Edgar R., maj. 8 inf.
Kellogg, Sanford C., maj. 4 cav. (lt. col.)
Kellogg, William L., lt. col. 5 inf.
Kemp, Ulysses G., 2 lt. 8 cav.
Kendall, Henry M., capt. 6 cav.
Kendrick, Fred. M. H., capt. 7 inf.
Kenly, William L., jr., 2 lt. 4 art.
Kennedy, William B., maj. 4 cav.
Kennon, Lyman W. V., 1 lt. 6 inf.
Kent, Jacob F., lt. col. 18 inf.
Kernan, Francis J., 1 lt. 21 inf.
Kerr, James T., 1 lt. 17 inf.
Kerr, John B., capt. 6 cav.
Ketchum, Daniel W., 2 lt. 2 art.
Ketchum, Hiram H., capt. 22 inf.
Kilbourne, H. S., capt. asst. surg.
Kilpatrick, Robert L., col. retired.
Kimball, Amos S., maj. qm. dept.
Kimball, Frederick C., 2 lt. 5 inf.
Kimball, James P., maj. med. dept.
King, Charles, capt. retired.
King, William R., lt. col. eng.
Kingman, Dan C., capt. eng.
Kingsbury, Henry P., capt. 6 cav.
Kinzie, David H., capt. 5 art. (maj.)
Kirby, Henry, 1 lt. 10 inf.
Kline, Jacob, lt. col. 9 inf.
Kneedler, W. L., capt. asst. surg.
Knight, John G. D., capt. eng.
Kobbé, William A., capt. 3 art. (maj.)
Koops, Carl, 2 lt. 13 inf.
Krause, William, capt. retired.
Kreps, Jacob F., 1 lt. 22 inf.
Kuhn, Joseph E., 1 lt. eng.
Lacey, Francis E., jr., 2 lt. 10 inf.
LaGarde, L. A., capt. asst. surg.
Lamoreux, Thomas B., 2 lt. 4 art.
Lancaster, James M., capt. 3 art.
Landis, J. F. Reynolds, 1 lt. 1 cav.
Langdon, Loomis L., col. 1 art.
Langfitt, William C., 1 lt. eng.
Larned, Charles W., prof. mil. acad.
Lassiter, William, 2 lt. 1 art.
Lassiter, Willlam, 1 lt. 16 inf.
Latimer, Alfred E., maj. retired.
Lawton, Edward P., 2 lt. 13 inf.
*Lazelle, Henry M., col. 18 inf.
Prize Essayist, 1882.
Leach, Smith S., capt. eng.
Leary, Peter, jr., capt. 4 art.
Lebo, Thomas C., capt. 10 cav.
Lee, Harry R., 2 lt. 11 inf.
Lee, J. G. C., maj. qm. dept. (lt. col.)
Lemly, Henry R., 1 lt. 3 art.
Lewis, Edward M., 2 lt. 11 inf.
Lewis, Isaac N., 1 lt. 2 art.
Lewis, Thomas J., 1 lt. 2 cav.
Leyden, James A., 1 lt. 4 inf.
Lieber, Guido N., col. j. a. gen. dept.
Liggett, Hunter, 1 lt. 5 inf.
Lincoln, Sumner H., capt. 10 inf.
Liscum, Emerson H., maj. 22 inf.
Lissak, Ormond M., 1 lt. ord. dept.
Litchfield, H. G., capt. 2 art. (lt. col.)
Littell, Isaac W., 1 lt. 10 inf.
Livermore, William R., maj. eng.
Livingston, La Rhett L., col. 3 art.
Lloyd, Edward, 1 lt. 15 inf.
Lockwood, John A., 1 lt. 4 cav.
Lodor, Richard, lt. col. 1 art. (col.)
Lomia, Luigi, 1 lt. 5 art.
London, Robert, capt. 5 cav.
Long, Eli, brig. gen. retired. (M. G.)
Long, Oscar F., 1 lt. 5 inf.
Lord, James H., maj. qm. dept.
Lott, George G., capt. retired.
Loud, John S., capt. 9 cav.
Loughborough, R. H. R., capt. 25 inf.
Loveridge, Wilbur, 1 lt. 3 art.
Lovering, Leonard A., 1 lt. 4 inf.
Lucas, Eugene W. Van C., 1 lt. eng.
Ludington, M. I., lt. col. qm. dept.
Ludlow, Henry H., 1 lt. 3 art.
Ludlow, William, maj. eng. (lt. col.)
Lundeen, John A., 1 lt. 4 art.
Lusk, James L., capt. eng.
Lydecker, Garrett J., lt. col. eng.

Lyle, David A., capt. ord. dept.
Lyon, Henry G., 2 lt. 17 inf.
MacArthur, A., jr., maj. a. g. dept.
Macauley, C. N. B., capt. asst. surg.
Macdonald, Godfrey H., 1 lt. 1 cav.
Macfeely, Robert, brig. gen. retired.
Mackenzie, Alexander, maj. eng.
Macklin, James E., capt. 11 inf.
MacMurray, J. W., capt. 1 art. (maj.)
Macomb, Augustus C., 1 lt. 5 cav.
Macomb, Montgomery M., 1 lt. 4 art.
Maguire, Edward, capt. eng.
Mahan, Frederick A., capt. eng.
Maize, William R., capt. retired.
Mallery, John C., maj. eng.
Mallory, John S., 1 lt. 2 inf.
Mansfield, Francis W., capt. 11 inf.
Mansfield, Samuel M., lt. col. eng.
Markland, Matthew, capt. retired.
Markley, Alfred C., capt. 24 inf.
Marsh, Frederick, 1 lt. 1 art.
Martin, Charles H., 2 lt. 14 inf.
Martin, George W., 2 lt. 18 inf.
Martin, James P., lt. col. a. g. dept.
Martin, Medad C., capt. qm. dept.
Martin, William F., 2 lt. 25 inf.
Mason, Chas. F., 1 lt. asst. surg.
Mason, Charles W., 1 lt. 4 inf.
Mason, Edwin C., col. 3 inf.
Massey, Solon F., 1 lt. retired.
Mauldin, Frank G., 2 lt. 3 art.
Maus, Louis M., capt. asst. surg.
Maus, Marion P., capt. 1 inf.
May, Will T., 1 lt. 15 inf.
Maynadier, Wm. M., maj. pay dept.
McAndrew, James W., 2 lt. 21 inf.
McBlain, John F., 1 lt. 9 cav.
McCain, Henry P., 1 lt. 14 inf.
McCaleb, Thomas S., capt. 9 inf.
McClellan, John, 1 lt. 5 art.
McClernand, Edward J., capt. 2 cav.
McClure, Charles, 1 lt. 18 inf.
McConihe, Saml., capt. 14 inf. (lt. col.)
McCook, Alex. McD., B. G. (M. G.)
McCorkle, Henry L., 2 lt. 25 inf.
McCoy, Frank B., 1 lt. 3 inf.
McCrea, Tully, maj. 5 art.
McCreery, G., capt. asst. surg.
McDonald, John B., 1 lt. 10 cav.
McElderry, Henry, maj. med. dept.
McFarland, Munroe, 2 lt. 21 inf.
McFarland, William C., capt. 16 inf.
McGregor, Thomas, maj. 2 cav.
McGuire, Thomas H., 2 lt. 25 inf.
McGunnegle, George K., capt. 15 inf.
McIndoe, James F., add. 2 lt. eng.
McIntyre, Frank, 2 lt. 19 inf.
McIver, George W., 1 lt. 7 inf.
McKeever, Chauncey, col. a. g. dept. (B. G.)
McKibbin, Chambers, maj. 25 inf.
McKinstry, Charles H., 2 lt. eng.
McLaughlin, William H., capt. 18 inf.
McLoughlin, G. H., capt. ret. (maj.)
McMahon, John E., 2 lt. 4 art.
McNamee, Michael M., 2 lt. 3 cav.
Mendenhall, John, col. 2 art.
Menoher, Charles T., 2 lt. 1 art.
Mercur, James, prof. mil. acad.
Merriam, Henry C., col. 7 inf.
Merrill, Abner H., capt. 1 art.
Merritt, Wesley, brig. gen. (M. G.)
Metcalfe, Henry, capt. ord. dept.
Meyer, Oren B., 2 lt. 2 cav.
Meyler, James J., 2 lt. eng.
Michie, Peter S., prof. mil. acad.
Michler, Francis, capt. 5 cav.
Middleton, J. V. D., maj. med. dept.
Miles, Nelson A., maj. gen.
Miley, John D., 2 lt. 5 art.
Millar, Edward A., 1 lt. 3 art.
Miller, Alexander M., maj. eng.
Miller, Charles, 2 lt. 11 inf.
Miller, Crosby P., capt. qm. dept.
Miller, Marcus P., maj. 5 art. (lt. col.)
Miller, William H., capt. qm. dept.
Millis, John, 1 lt. eng.
Mills, Albert L., 1 lt. 1 cav.
Mills, Anson, lt. col. 4 cav.
Mills, Samuel M., capt. 5 art.
Mills, Stephen C., 1 lt. 12 inf.
Miner, Charles W., capt. 22 inf.
Mitcham, Orin B., capt. ord. dept.
Mitchell, James, 2 lt. 15 inf.
Mizner, Henry R., col. retired.

Mizner, John K., col. 10 cav.
Moale, Edward, lt. col. 3 inf.
Montgomery, George, 2 lt. 2 art.
Montgomery, Robert H., maj. ret.
Moody, Thomas M., 2 lt. 22 inf.
*Moore, Francis, capt. 9 cav.
Moore, Tredwell W., 1 lt. 22 inf.
Mordecai, Alfred, col. ord. dept.
Morgan, M. B., col. sub. dept. (B. G.)
Moriarty, A. I., 2 lt. 9 inf.
*Morris, Arthur, capt. retired.
Morris, Charles, capt. 5 art.
Morrison, John F., 1 lt. 20 inf.
Morrow, Albert P., col. 3 cav.
Morse, Benjamin C., 1 lt. 18 inf.
Mosher, Theodore, 1 lt. 22 inf.
Mott, T. Bentley, 2 lt. 1 art.
Mott, Wallace, capt. retired.
Muhlenberg, John C., maj. pay dept.
Mulhall, Stephen J., 1 lt. retired.
Mumford, Thomas S., capt. retired.
Munn, Curtis E., maj. med. dept.
Munson, Jacob F., capt. 6 inf.
Murphy, John, capt. 14 inf.
Murray, Arthur, 1 lt. 1 art.
Murray, Robert, brig. gen. retired.
Myrick, John, R., capt. 3 art. (maj.)
Nash, William H., maj. sub. dept.
Neary, William C., 2 lt. 3 inf.
Newcomb, Warren P., 1 lt. 5 art.
Newcomer, Henry C., 1 lt. eng.
Nichols, Maury, 1 lt. 7 inf.
Nichols, William A., 1 lt. 23 inf.
Nickerson, James D., 1 lt. 17 inf.
Niles, Lotus, 1 lt. 2 art.
Niskern, Albert D., 2 lt. 20 inf.
Noble, Robert H., 1 lt. 1 inf.
Nordstrom, Charles E., capt. 10 cav.
Norris, Basil, col. retired.
Norvell, Stevens T., maj. 10 cav.
Nowlan, Henry J., capt. 7 cav.
Noyes, Charles R., 1 lt. 9 inf.
Nugent, Robert, maj. retired (col.)
Oakes, James, col. retired (B. G.)
O'Brien, Lyster M., capt. 17 inf.
O'Brien, Michael J., 1 lt. 5 inf.
O'Connor, Charles M., capt. 8 cav.
Olmsted, Jerauld A., capt. 9 cav.
O'Neil, Joseph P., 1 lt. 25 inf.
O'Reilly, Robert M., maj. med. dept.
Ostheim, Louis, 1 lt. 2 art.
Otis, Elwell S., col. 20 inf.
Paddock, George H., capt. 5 cav.
Page, Charles, col. asst. surg. gen.
Page, John H., lt. col. 22 inf.
Palfrey, Carl F., capt. eng.
Parker, Charles F., 2 lt. 2 art.
Parker, Daingerfield, lt. col. 13 inf.
Parker, James, capt. 4 cav.
Parker, Montgomery D., 1 lt. 9 cav.
Parkhurst, Charles D., 1 lt. 4 art.
Parmerter, Almon L., 1 lt. 21 inf.
Patch, Alexander M., capt. retired.
Patten, William S., capt. qm. dept.
Patterson, George T. T., 1 lt. 14 inf.
Patterson, John H., maj. 3 inf.
Patterson, Robert H., 1 lt. 1 art.
Patterson, Thomas C., 1 lt. 1 art.
Paul, Charles R., capt. 18 inf.
Paulding, William, 1 lt. 10 inf.
Paxton, Robert G., 2 lt. 10 cav.
Pearson, Edward P., col. 10 inf.
Peck, Fremont P., 1 lt. ord. dept.
Penn, Julius A., jr., 2 lt. 13 inf.
Penney, Charles G., capt. 6 inf.
Pennington, A. C. M., maj. 4 art. (col.)
Penrose, Charles W., 1 lt. 11 inf.
Perrine, Henry P., capt. retired.
Perry, Alex. J., col. qm. dept. (B. G.)
Perry, Alexander W., 2 lt. 9 cav.
Perry, John Adams, 1 lt. 8 inf.
Pershing, John J., 2 lt. 6 cav.
Peterson, Matt R., 2 lt. 10 inf.
Pettit, James S., capt. 1 inf.
Phillips, Charles L., 1 lt. 4 art.
Phillips, William A., 2 lt. 22 inf.
Phipps, Frank H., maj. ord. dept.
Phister, Nat P., 1 lt. 1 inf.
Pilcher, Jas. E., capt. asst. surg.
Pitcher, John, 1 lt. 1 cav.
Pitcher, Thos G., col. ret. (B. G.)
Pitcher, William L., capt. 8 inf.
Pitman, John, capt. ord. dept.
Plummer, Edward H., 1 lt. 10 inf.
Pollock, Otis W., capt. 23 inf.
Pollock, Robert, capt. retired.

Pond, George E., capt. qm. dept.
Poole, DeWitt C., maj. pay dept.
Poore, Benjamin A., 2 lt. 12 inf.
Pope, Benjamin F., maj. med. dept.
Pope, James W., capt. qm. dept.
Pope, John, jr., 1 lt. 1 art.
Porter, Fitz-John, col. retired. (B. G.)
Post, James C., maj. eng.
Postlethwaite, Wm. M., chap. and prof. mil. acad.
Potter, Carroll H., capt. 18 inf.
Potter, Charles L., 1 lt. eng.
Potter, Joseph H., brig. gen. retired.
Potts, Ramsay D., 1 lt. 3 art.
Powell, J. L., capt. asst. surg.
Pratt, Edward B., capt. 23 inf.
Pratt, Richard H., capt. 10 cav.
Pratt, Sedgwick, 1 lt. 3 art.
Price, Butler D., capt. 4 inf.
Price, Philip M., capt. eng.
Pulford, John, col. retired.
Purington, G. A., maj. 3 cav. (col.)
Purssell, Benjamin M., 1 lt. 19 inf.
Quinby, Ira, capt. 11 inf.
Quinn, James B., maj. eng.
Quinn, Thomas F., capt. 4 inf.
Quinton, William, capt. 7 inf.
Rafferty, William A., maj. 2 cav.
Rafferty, William C., 1 lt. 1 art.
Ramsey, Joseph G., maj. 3 art.
Ramsey, Frank De W., 1 lt. 14 inf.
Randall, George M., maj. 4 inf.
Randlett, James F., maj. 9 cav.
Randolph, Benjamin H., 1 lt. 3 art.
Randolph, Wallace F., maj. 3 art.
Rawolle, William C., capt. 2 cav.
Ray, P. Henry, capt. 8 inf.
Raymond, Charles W., maj. eng.
*Read, George W., 1 lt. 5 cav. ***Prize Essayist, 1889.***
Reade, Philip, capt. 3 inf.
*Reed, Henry A., 1 lt. 2 art. ***Prize Essayist, 1891.***
Regan, James, capt. 9 inf.
Reichmann, Carl, 1 lt. 9 inf.
Reilly, Henry J., 1 lt. 5 art.
Reilly, James W., maj. ord. dep.
Reynolds, Alfred, capt. 20 inf.
Reynolds, Charles A., lt. col. retired.
Reynolds, William B., 1 lt. 14 inf.
Rhodes, Charles D., 2 lt. 6 cav.
*Rice, Edmund, capt. 5 inf. (lt. col.)
Rice, Sedgwick, 1 lt. 7 cav.
Richard, Charles, capt. asst. surg.
Richards, William V., capt. 16 inf.
Richardson, Wilds P., 1 lt. 8 inf.
Richmond, Ephraim T. C., capt. 2 art.
Ridgway, Thomas, 1 lt. 5 art.
Ripley, Henry L., 1 lt. 3 cav.
Ritzius, Henry P., capt. 25 inf.
Rivers, Tyree R., 1 lt. 3 cav.
Rivers, William C., 2 lt. 1 cav.
Robe, Charles F., capt. 25 inf.
Roberts, Benjamin K., capt. 5 art.
Roberts, Cyrus S., capt. 17 inf.
Roberts, Harris L., 1 lt. 19 inf.
Robinson, A. G., lt. col. qm. dept.
Robinson, George F., maj. pay dept.
Robinson, Henry E., 1 lt. 4 inf.
Robinson, John C., maj. gen. retired.
Robinson, S. Q., capt. asst. surg.
Rochester, W. B., brig. gen. retired.
Rockenbach, Samuel D., 2 lt. 10 cav.
Rockwell, James, jr., capt. ord. dept.
Rodenbough, Theo. F., col. ret. (B.G.)
Rodman, Samuel, jr., 1 lt. 2 art.
Rodney, George B., capt. 4 art. (maj.)
Roemer, Paul, capt. retired.
Roessler, Solomon W., capt. eng.
Rogers, James S., 1 lt. 20 inf.
Rogers, Robert M., capt. 2 art.
Rogers, William P., capt. 17 inf.
Root, Edwin A., 1 lt. 19 inf.
Rose, Robert W., 2 lt. 5 inf.
Rossell, William T., capt. eng.
Roudiez, Leon S., 1 lt. 1 inf.
Rowan, Andrew S., 1 lt. 19 inf.
*Rowan, Hamilton, 1 lt. 2 art.
Rucker, Louis H., capt. 9 cav.
Ruger, Thomas H., brig. gen.
Ruggles, Colden L. H., 2 lt. 3 art.
Ruggles, G. D., col. a. g. dept. (B. G.)
Ruhlen, George, capt. qm. dept.
Runcie, James E., 1 lt. 1 art.
Russel, Edgar, 2 lt. 3 art.
Russell, Andrew H., capt. ord. dept.

Russell, Edmund K., capt. 1 art.
Russell, George B., maj. 5 inf.
Russell, Gerald, maj. retired.
Rutherford, Robert G., 1 lt. ret. (capt.)
Sage, George E., 1 lt. 5 art.
Sample, William R., 2 lt. 14 inf.
Sanborn, Washington I., capt. 25 inf.
Sanford, George B., lt. col. 9 cav.
Sanger, Jos. P., maj. ins. gen. dept.
*Sanno, James M. J., capt. 7 inf.
Sargent, Frederic H., 2 lt. 7 inf.
Sarson, Horace B., capt. 2 inf.
Satterlee, Charles B., 1 lt. 3 art.
Sawtelle, C. G., lt. col. qm. dept. (B.G.)
*Sawyer, J. Estcourt, 1 lt. 5 art.
Sayre, Farrand, 1 lt. 8 cav.
Scantling, John C., capt. 2 art.
Schenck, Alexander D., 1 lt. 2 art.
Schindel, Jeremiah P., capt. 6 inf.
Schley, Thomas F., 2 lt. 23 inf.
Schofield, Charles B., capt. 2 cav.
Schofield, John M., maj gen.
Schwan, Theodore, maj. a g. dept.
Scott, Albert B., 1 lt. 13 inf.
Scott, William S., 1 lt. 1 cav.
Scriven, George P., 1 lt. sig. corps.
Seay, Samuel, jr., 2 lt. 21 inf.
Sehon, John L., 1 lt. 20 inf.
Sewell, John S, add. 2 lt. eng.
Settle, Douglas, 2 lt. 10 inf.
Seyburn, Stephen Y., 1 lt. 10 inf.
Shafter, William R., col. 1 inf.
Shaler, Charles, capt. ord. dept.
Sharp, Thomas, capt. 17 inf.
*Sharpe, Alfred C., 1 lt. 22 inf.
Prize Essayist, 1887.
Sharpe, Henry G., capt. sub. dept.
Shepherd, Oliver L., col. ret. (B. G.)
Sheridan, M.V., maj. a.g. dept. (lt. col.)
Shipp, William E., 1 lt. 10 cav.
Shorkley, George, capt. ret. (maj.)
Shunk, William A., 1 lt. 8 cav.
Shuttleworth, Edward A., 2 lt. 11 inf.
Sibert, William L., 1 lt. eng.
Sibley, Frederick W., 1 lt. 2 cav.
Sickles, Daniel E., maj. gen. retired.
Sigerfoos, Edward, 2 lt. 5 inf.
Sigworth, John M., 2 lt. 10 inf.
Simpson, John, maj. qm. dept.
Simpson, M. D. L., col. ret. (M. G.)
Simpson, William A., 1 lt. 2 art.
Sinclair, William, maj. 2 art.
Sladen, Fred. W., 2 lt. 14 inf.
*Slaker, Adam, 1 lt. 1 art.
Slocum, Herbert J., 1 lt. 7 cav.
Small, M. P., lt. col. sub. dept. (B. G.)
Smedberg, Wm. R., capt. ret. (lt. col.)
Smiley, Samuel E., 1 lt. 15 inf.
Smith, Abiel L., capt. 4 cav.
Smith, Charles S., capt. ord. dep.
Smith, Edmund D., 1 lt. 19 inf.
Smith, Frank G., maj. 2 art.
Smith, Frederick A., capt. 12 inf.
Smith, George R., maj. pay dept.
Smith, Jared A., lt. col. eng.
Smith Leslie, lt. col. retired.
Smith, Lewis, capt. 3 art.
Smith, Oskaloosa M., capt. sub. dept.
Smith, Sebree, 1 lt. 2 art.
Smith, Thomas M. K., capt. 23 inf.
Smith, William F., maj. ret. (M. G.)
Smoke, Samuel A., 2 lt. 18 inf.
Sniffen, Culver C., maj. pay dept.
Snyder, James A., capt. retired.
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Sparrow, Solomon E., 1 lt. 21 inf.
Sprague, Charles J., maj. retired.
Sprole, Henry W., capt. 8 cav.
Spurgin, Wm. F., capt. 21 inf. (maj.)
Stanhope, P. W., maj. ret. (lt. col.)
Stanley, David S., brig. gen. (M. G.)
Stanton, T. H., lt. col. pay dept.
Stanton, William S., maj. eng.
Stedman, Clarence A., capt. 9 cav.
Steele, Charles L., 1 lt. 18 inf.
Steele, Matthew F., 1 lt. 8 cav.
Stembel, James McB., capt. retired.
Sternberg, Geo. M., lt. col. med. dept.
Stevens, Charles J., 1 lt. 9 cav.
Stone, E. W., capt. 21 inf. (lt. col.)
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Stotsenburg, John M., 1 lt. 6 cav.
Stouch, George W. H., capt. 3 inf.
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Strong, Richard P., capt. 4 art.
Stuart, Sidney E., 1 lt. ord. dept.
Sturgis, Samuel D., 1 lt. 4 art.
Styer, Henry D., 1 lt. 13 inf.
Summers, John E., col. retired.
Sumner, Samuel S., lt. col. 6 cav.
Sutherland, Chas., brig. gen. surg. gen.
Swaine, Peter T., col. 22 inf.
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Tompkins, Selah R. H., 1 lt. 7 cav.
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Towar, Albert S., maj. pay dept.
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Townsend, E. D., B. G. ret. (M. G.)
Townsend, Edwin F., col. 12 inf.
Townsend, Thomas G., capt. 6 inf.
Townsley, Clarence P., 1 lt. 4 art.
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Treat, Charles G., 1 lt. 5 art.
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Tyson, Laurence D., 1 lt. 9 inf.
Uline, Willis, 2 lt. 12 inf.
Upham, John J., col. retired.
Van Deman, Ralph H., 2 lt. 21 inf.
Van Ness, William P., 1 lt. 1 art.
Van Orsdale, John T., capt. 7 inf.
Van Reed, William E., capt. retired.
Van Voast, James, col. retired.
Vestal, Solomon P., 2 lt. 5 cav.
Vickery, Richard S., maj. med. dept.
Vincent, T. M., col. a. g. dept. (B. G.)
Viven, John L., capt. 12 inf.
Vogdes, Anthony W., capt. 5 art.
Volkmar, William J., maj. a. g. dept.
Vollum, Edward P., col. retired.
Von Schrader, Frederick, 1 lt. 12 inf.
Vose, William P., capt. 2 art.
Vroom, Peter D., maj. ins. gen. dept.
Wade, James F., col. 5 cav.
*Wagner Arthur L., capt. 6 inf.
Prize Essayist, 1883.
Wagner, Henry, maj. 5 cav.
Wainwright, R. P. P., capt. 1 cav.
Waite, Henry De H. 1 lt. 5 cav.
Walcutt, Charles C., jr., 2 lt. 8 cav.

Walker, Leverett H., 1 lt. 4 art.
Wallace, William M., capt. 6 cav.
Ward, Frederick K., capt. 1 cav.
Ward, Thomas, maj. a. g. dept.
Warner, E. R., maj. ret. (lt. col.)
Warren, James G., 1 lt. eng.
Warrens, Charles H., capt. retired.
Warwick, Oliver B., 1 lt. 18 inf.
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Watkins, Robert B., 1 lt. 9 cav.
Watson, James W., 1 lt. 10 cav.
Watts, Charles H., capt. 5 cav.
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Webber, Edwin H., 1 lt. 20 inf.
Webster, Edmund K., 1 lt. 2 inf.
Webster, Frank D., 2 lt. 6 inf.
Webster, Warren, maj. ret. (lt. col.)
Weeks, George H., lt. col. qm. dept.
Wells, Almond B., maj. 8 cav.
Wells, Daniel T., capt. 8 inf. (maj.)
*Wesendorff, Max, capt. retired.
Wessells, Morris C., capt. 24 inf.
West, Barrington K., 1 lt. 6 cav.
West, Frank, capt. 6 cav.
West, Parker W., 1 lt. 3 cav.
Wetherill, Alexander M., capt. 6 inf.
Wham, Joseph W., maj. pay dept.
Wharton, John S., capt. retired.
Wheaton, Frank, brig. gen. (M. G.)
Wheelan, James N., capt. 2 cav.
Wheeler, Charles B., 1 lt. ord. dept.
Wheeler, Daniel D., capt. qm. dept.
Wheeler, Fred., capt. 4 cav.
Wheeler, Homer W., 1 lt. 5 cav.
Wherry, Wm. M., maj. 6 inf. (col.)
Whipple, Charles H., maj. pay dept.
Whipple, Charles W., capt. ord. dept.
Whipple, Stephen G., capt. retired.
Whipple, Wm. D., col. ret. (M. G.)
Whistler, Garland N., 1 lt. 5 art.
Whistler, Joseph N. G., col. retired.
White, John C., capt. retired.
White, John V., 1 lt. 1 art.
Whitside, Samuel M., maj. 7 cav.
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Wilder, Wilber E., capt. 4 cav.
Wildrick, A. C., maj. 5 art. (lt. col.)
Wilhelm, William H., 2 lt. 10 inf.
*Willard, Joseph H., capt. eng.
Willard, Wells, capt. sub. dept.
Willcox, Chas., 1 lt. asst. surg.
Willcox, Cornélis DeW., 1 lt. 2 art.
Willcox, Orlando B., B. G. ret. (M. G.)
Williams, Arthur, 1 lt. 3 inf.
Williams, Ephraim, 1 lt. ret. (capt.)
*Williams, John R., 1 lt. 3 art.
Williston, Edward B., maj. 3 art. (col.)
Wills, John H., 1 lt. 22 inf.
Wilson, Charles I., maj. pay dept.
Wilson, Eugene T., 2 lt. 1 art.
Wilson, George S., capt. 12 inf.
Wilson, James E., 1 lt. 5 inf.
Wilson, John M., lt. col. eng. (col.)
Wilson, Richard H., 1 lt. 8 inf.
Wint, Theodore J., maj. 10 cav.
Wisser, John P., 1 lt. 1 art.
Wittich, Willis, capt. 21 inf.
Wolf, Silas A., 1 lt. 4 inf.
Wood, Abram E., capt. 4 cav.
Wood, Edward E., capt. 8 cav.
Wood, H. C., lt. col. a. g. dept. (col.)
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Wood, Oliver E., 1 lt. 5 art.
Wood, Palmer G., 1 lt. 12 inf.
Wood, Thomas J., B. G. ret. (M. G.)
Wood, William M., 2 lt. 12 inf.
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Woodward, George A., col. retired.
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Wotherspoon, Wm. W., 1 lt. 12 inf.
Wren, William C., 1 lt. 17 inf.
Wright, Edmund S., 2 lt. 9 cav.
Wright, Horatio G., B. G. ret. (M. G.)
Wright, Walter K., 1 lt. 16 inf.

Wright, William M., 1 lt. 2 inf.
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Yates, Arthur W., 2 lt. 9 inf.
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Young, George S., 1 lt. 7 inf.
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Cooley, James C., lt. 5 cav. (capt.)
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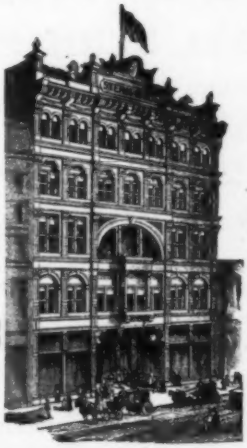

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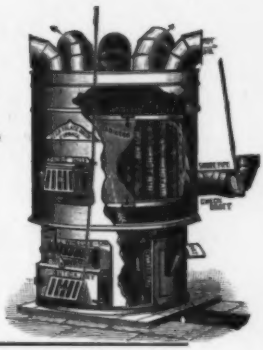

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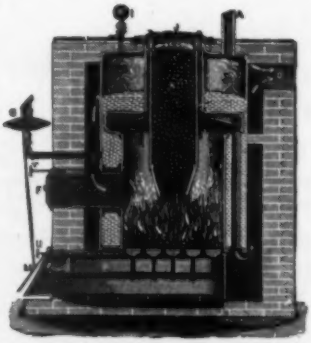

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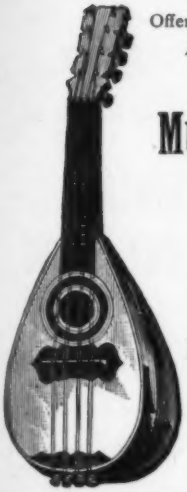

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Pears' Soap takes care of the skin, and the skin takes care of the rest of us. There are plenty of other soaps, but none without alkali. If we have got to wash, let us have a soap without alkali, PEARS'!

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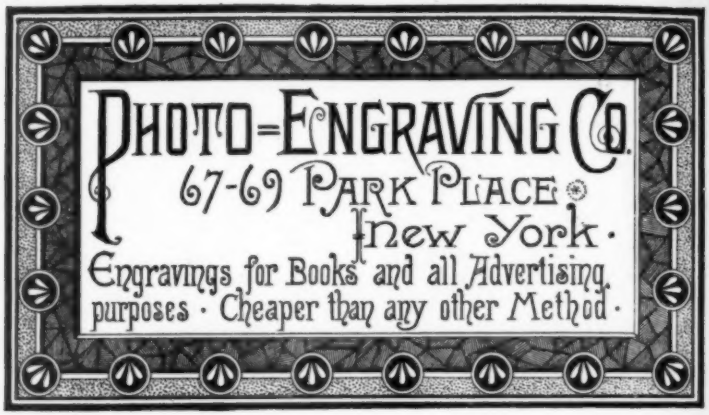
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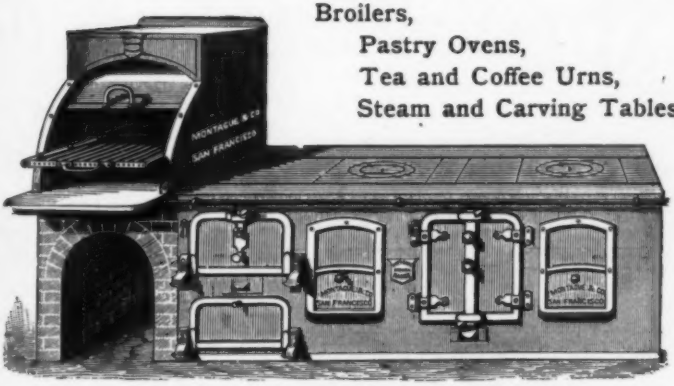

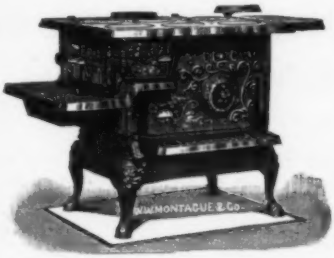

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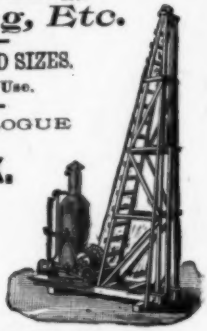

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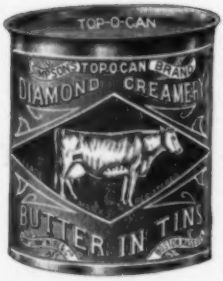

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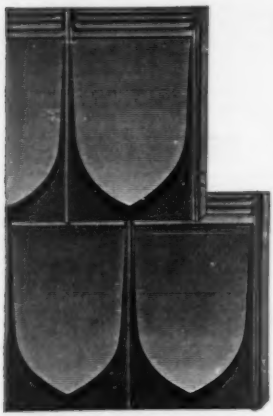

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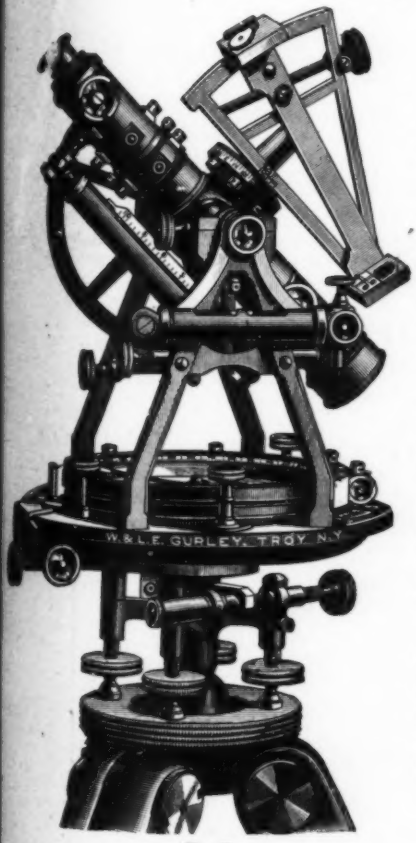

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Yours truly,
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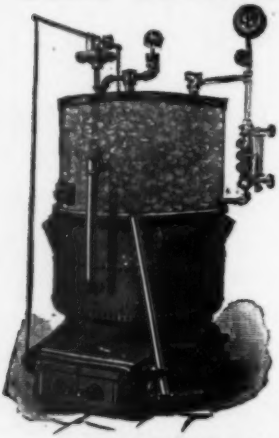

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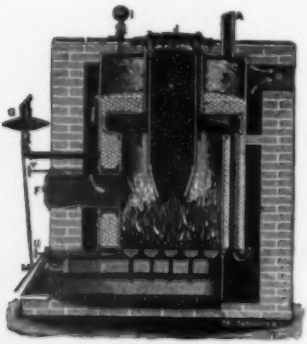

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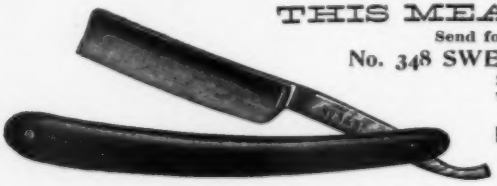

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